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THE SURGICAL TREATMENT OF DIFFUSE GENERAL PERITONITIS.

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I have been requested by our energetic Hon. Secretary to read a paper before a meeting of this Branch, and I have chosen to write on the subject of "The Surgical Treatment of Diffuse General Peritonitis." I have really nothing to tell you that is new. You will find it in all modern text books, but the paper I hope will provide some discussion on a subject which must be intensely interesting to every practitioner. My object is to point out to you what a radical difference the methods introduced by Fowler and Murphy have made on the mortality of this septic infection, and how from a previous heavy death-date we can hope and expect in most cases a recovery, even from apparently the most hopeless of cases. Perhaps the most striking point is the simplicity of the treatment, and the fact that the less we interfere the better are the results.

In the February (1906) number of the "Annals of Surgery," a Canadian surgeon, Le Conte, described the methods adopted by Murphy, of Chicago, in the treatment of acute diffuse septic peritonitis, and how he was so impressed by the result of his technique that he adopted his method in toto.

In Binnie's Surgery the essentials of the technique are summed up:—

1. Rapid elimination of the cause of peritonitis. This with the least possible handling of the viscera.
2. Tubular drainage of the lowest portion of the pelvis through a supra pubic opening, and free drainage through the operative incision.
3. Elimination of all time-consuming procedures at the time of operating. Do not attempt to clean the peritoneum by mopping or flushing.
4. Fowler's position after operation.
5. Absorption of large quantities of salt solution through the rectum.
6. Prevent peristalsis by withholding all foods or liquids by the mouth. Opium is objectionable, but may be required.

Shortly after this article appeared Dr. Jackson, who was impressed by the remarkable results obtained by this method of treatment, introduced the technique into the Brisbane Hospital, and since then it has been carried out with certain modifications by the surgeons there with marked success.

Before this time the procedure adopted was usually the opening of the abdominal cavity, the removal of the focus of the disease, if it could be easily got at, and the washing and mopping out the septic contents, all of which meant a great deal of handling of the abdominal viscera. The drainage tubes were placed in various positions—such as the flanks, the inguinal region, and the line of incision, and the patient was left in the recumbent position. Most of the cases died on our hands, and the results were anything but satisfactory.

Fowler, I think, was the first who advocated the position which now is called after him—"Fowler's position." This was a big step in the treatment of septic peritonitis. Peritonitis is dangerous according to the extent of the toxins absorbed into the general circulation. The upper part of the abdominal cavity absorbs most freely. Fowler's position gravitates the infectious material to the most dependent parts, where drainage is placed. In this way we are enabled to free the most absorbing part of the peritoneal cavity of toxins, and also remove them from that part to a place where they do least damage. Fowler has pointed out that the elevated head and trunk position offers the additional advantages of assisting materially in relieving the nausea and vomiting, of favouring peristalsis, and of relieving distension by the passage of flatus. The importance of the last-named in the treatment cannot be over-estimated.

The present methods adopted here have largely decreased the mortality in acute general diffuse peritonitis. Before the present methods were adopted most cases were fatal, but now it is rarely that we lose a case at all. The statistics of last year record one death from operations on appendicitis, a large percentage of which were of the acute fulminating type, accompanied by acute diffuse peritonitis. We see a large number of these cases because so many refuse operation outside until their condition is serious, and they are then brought to the hospital.

The method of treatment adopted by myself in these cases varies a little from that first advocated by Le Conte, but the technique is a little simpler, and the results all that can be desired.

The importance of rapid work is often very obvious in these cases. Many of them are in a very serious condition, and the prolongation of an anæsthetic and the unnecessary handling of the abdominal contents (particularly the latter) are to be guarded against. The focus, such as ruptured intestine, should be closed, or a gangrenous appendix should be removed. I never make any attempt whatever to remove pus or to wash out the contents, or even partially to mop them out.

A tubular rubber drain slit down the side, with a gauze wick inside and a gauze drain alongside it, is placed in the abdominal cavity down to the bottom of the pelvis through a low abdominal incision. The usual appendix incision will meet the case, and there is no need, in my opinion, for an extra supra-pubic incision. A small drain is placed also to the focus of the trouble, such as a ruptured gastric ulcer or ruptured gut, if it is not in the

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pelvis itself, or in the line of drainage. The whole of the operative procedure should not, save in extraordinary cases, take more than 20 minutes. The longer the anæsthetic and the greater the handling of the peritoneum the greater the shock, and this is what we want to avoid. After the operation the patient is returned to bed, and promptly placed in Fowler's position. The head is well raised up, and the patient also placed in a sitting-up position (that is, as far as possible in an erect position), and the abdominal septic contents have every opportunity of gravitating to the area where the drainage tubes will act freely.

This position also has another great advantage, and that is the comparative freedom these cases have from nausea and vomiting. This fact was first pointed out to me by a very observant sister, and corroborates my personal observation. I have no doubt that the posture has this great additional advantage, and would recommend it even in other abdominal cases where nausea and vomiting is more or less intractable. The patient is also enabled to pass flatus easier, and this helps to give him great relief. The reversed position, with the lowered head and trunk induces nausea and vomiting.

Personally I am not an advocate of the administration of salt solution through the lower bowel so strongly recommended by Le Conte. Normal salt solution is allowed by various devices to trickle drop by drop into the rectum, through a nozzle with a number of holes in it, at the rate of a pint an hour.

The following advantages are claimed for it:—

1. It helps to increase the secretion of urine, and thus to eliminate toxins.
2. It reverses the current in the lymphatics of the peritoneum, and makes it a secreting surface instead of an excreting surface, and thus prevents absorption and helps to wash down the septic abdominal contents to the most dependent parts.

These claims are difficult to understand, and I believe that experiments have proved that there is no such thing as a retroperitoneal flow. At all events I cannot understand it.

Personally I do not use the saline at all. It will not always work satisfactorily. Some patients will not absorb any saline, and simply collect about a pint or more in the lower bowel, and pass it in the bed like a returned enema, and it is constantly dribbling back. There is a great deal of work in its application, and its administration demands constant attention. The patient is always uncomfortable, generally with a wet bed, and the patients do just as well without it, without the discomfort to themselves and the extra work entailed. Great claims are made of the advantage of saline solution where there is also loss of blood, but we have all seen many cases where it has not been used in an exsanguinated obstetric case, and have noted how these cases recover without its use. Its value is greatly over-estimated in the treatment of shock and loss of blood.

If a patient were considered by the surgeon to be in a condition requiring saline solution, I would advise him to give it intravenously in preference. I know that some here would pin their faith on its use, but later on I will quote some cases in a most desperate condition, in which it was not used.

It is wonderful how these patients pick up after the operation. Though there is little or no nausea or vomiting, it is well to withhold any food which will tend to increase peristalsis. The patients here are given albumen water with a little lemon juice in small doses at frequent intervals, for two days, and, if the progress is satisfactory, zyminized milk, then milk, and so on to an ordinary diet, but of course the rate of progress is judged on each case. Opium is avoided if possible, but where there is great pain it may be necessary. Hypodermic injections of morphine are used.

Purgatives are best left alone. At one time I thought it advisable to start early, but I am convinced that it is far better to depend on the use of the enemata. Copious simple enemata with turpentine are the most efficacious, and should be given the second or third day after the operation, or earlier if the abdomen is distended. Failure to act at first is common, but a repetition the next day will usually produce the desired result. I think it is advisable to give purgatives, if necessary, when the patient is well on the road to recovery, and the danger of peritonitis has gone.

The drainage tubes and gauze are usually not touched for two or three days, but as a rule the outer dressings have to be changed frequently on account of the copious discharge. Dressing for removal of the gauze has sometimes to be done under an anæsthetic; the gauze, however, when soaked with pus, may come away easily. The tube is left alone, but the gauze wick is changed every day. The tube may be gradually shortened, but this may take a week or two, or even longer to accomplish. In the majority of cases it pushes its way out. It should never be removed, as it may be impossible to replace it, and the result may be a large abscess which will require further operative treatment.

A tendency exists to keep the patient too long in Fowler's position. I think as a rule that the bed can be lowered to its usual position on the third or fourth day, and the patient may be kept in the sitting-up position for a few days longer, after which the recumbent posture can be assumed.

To illustrate what can be done I will quote a few cases which have come under my personal care. They have all been emergency cases, and some were so bad on admission that one could get no history, and had simply to operate for the relief of a diffuse septic peritonitis, and find out the seat of the trouble during the operation. Included in the list are perforated gastric ulcer, perforated duodenal ulcer, perforated typhoid ulcer, ruptured bowel, ruptured sepatic abscess.

I could quote a large number of ruptured appendicitis cases that were accompanied by acute diffuse peritonitis, but I have already mentioned the routine treatment followed; all the following have some special interest beyond the septic condition of the peritoneum:—

Perforated Gastric Ulcer and Perforated Duodenal Ulcer.

Apart from the desperate condition of these two cases, the interesting part of the recovery was the fact that in neither case was the hole into the bowel sewn up or covered.

Perforated Gastric Ulcer.—J. C., aged 50, was admitted on December 1, 1913, and discharged on February 9, 1914. Five hours before admission he was seized with some sudden abdominal pain, travelling from the left side of the thorax and then all over the abdomen. When he was admitted he complained of pain in the region of the umbilicus, but presented no other evidence of peritonitis. He had been drinking heavily for the last few weeks, but his bowels had been opened regularly. He vomited on admission. Beyond the fact that he had a similar attack ten years previously no definite history could be procured from him. The abdomen became hard and distended, but there was no action of enemata. He began to vomit yellow fluid at intervals. He was transferred to the surgical ward. I was in considerable doubt as to where the trouble was that was causing his peritonitis. An operation was performed. A medium incision below the umbilicus into the peritoneal cavity was made. There was a copious discharge of yellow fluid and flakes of lymph, which were scattered all over the intestines. The vessels of the gut were greatly congested, and there were patches on the bowels which were very dark, and looked almost gangrenous. The second incision, in the epigastric area, enabled me to examine the stomach. On the posterior surface of the stomach there was a large hard mass, with a perforation large enough to admit a finger into the stomach. This mass was firmly bound down with adhesions. The stomach incision was not sewn up, but drainage was made above and below the umbilicus as before. When the patient was sent back to bed his condition was so bad that I did not think he would live for more than an hour. In fact, on the table he was hardly breathing, and the anæsthetist had a very anxious time. He was treated in the usual way, and made a practically uninterrupted recovery. His pulse and his temperature were almost normal from the time of his admission until the time of his discharge.

Perforated Duodenal Ulcer.—M.D. aged 50, male, admitted May 5, 1914. This man had been drinking heavily for three days, and had been complaining of pain for some seven hours in the neighbourhood of the umbilicus, but he was so ill and so much under the influence of liquor that it was impossible to obtain any clear information from him. He had the typical face of acute peritonitis; his knees were drawn up, and the abdominal wall was tender, distended, rigid, and contracted. His temperature was 97 deg. and his pulse 120. The abdomen was promptly opened below the umbilicus, under a mixture of chloroform and ether. A large amount of straw-coloured fluid and lymph was found. The abdomen was then opened at the epigastrium, where lymph and pus were found. A thickened hard mass was found in the region of the duodenum, which was firmly bound down. There was a hole into the abdomen. His condition had become very serious. A drainage tube was placed in each wound, and no sewing up of the perforation was attempted. The wound healed well and the patient has been discharged. He was very sick on one or two occasions, but otherwise has had practically an uninterrupted recovery.

Perforated Typhoid Ulcer.

These two cases are of special interest. They are the only two cases in which I have seen recovery follow operation. Dr. Meek, however, had one under his care recover during my absence on holidays, and the method of treatment was identical as in my cases.

Perforated Typhoid Ulcer.—Case I.: T. J. L., aged 43, male, admitted December 15, 1913; discharged February 6, 1914. A very indefinite history of illness for a week or so before admission was obtained. He was of alcoholic habits, and generally a waster. On December 18, at 8 p.m., he complained of severe pain in the abdomen, but I did not see him until midnight. At 6 p.m. his pulse was 96, and his temperature 101 deg., and at midnight the pulse was 104 and the temperature 105 deg. His abdomen was slightly distended. The operation took place three hours after perforation had taken place. The abdomen was opened in the middle line, in the usual way, and there was a large perforated ulcer near the cæcum, through which a little finger could be passed into the intestine. Two large ulcers near this one looked in a dangerous condition. Fæces and turbid fluid were lying loose in the abdominal cavity. The lower end of the small bowel and its neighbourhood were covered with lymphatic exudation. The usual treatment was carried out, with the result that the patient made an uninterrupted but long recovery, which he celebrated by getting very drunk.

Perforated Typhoid Ulcer.—Case II.: J. B., aged 34 years, was admitted on May 23, 1914, suffering from typhoid fever. He was delirious, and not in a condition to relate the history of his illness. We learned subsequently that he had been ill for two or three weeks. Examination of his serum yielded a negative result to Widal's test. On May 27 he was seized with sudden acute pain above the umbilicus. His abdomen became slightly rigid and tender. The temperature and pulse did not alter. He was placed on the operating table, and the abdomen was opened up below the umbilicus. A recently perforated typhoid ulcer was found at the lower end of the intestine; it was sewn up. There were other typhoid ulcers, one of which looked dangerous. The wound was then dressed in the usual way for about a week. About ten days after the operation the patient complained of great pain in the abdomen, and fæces and undigested food were found in the drainage tube. A fresh perforation had evidently taken place; whether this occurred at the ulcer discovered at the operation or not I cannot say. The patient was very sick, and continually hiccoughing. He subsequently made progress towards recovery.

Ruptured Intestine.

The interest of this case lay in the length of time which elapsed before the operation, and the rapidity of the recovery. T. H., aged 35, male, was admitted

February 4, 1914, and discharged on March 13, 1914. Early in the afternoon of February 3, while at Caboolture, this man was struck in "the stomach" by a piece of timber, 4in. by 1in. by 6ft. He complained of violent abdominal pains, and vomited. He was brought to the Brisbane Hospital, and was admitted nine hours after the accident with a rigid, tender, slightly distended abdomen. Vomiting still continued. His temperature was 98 deg., and his pulse rate 84. He was placed at once on the operating table. The abdomen was opened in the middle line below the peritoneal cavity. A large quantity of turbid fluid mixed with intestinal contents and fæces escaped. A large tear, one and a half inches long, was discovered in the ileum, about a foot from the cæcum. It was rapidly sewn up. This man was discharged within the month completely cured.

Ruptured Abscess of Liver.

Cases of true abscess inside the liver rarely recover. J.C., aged 31, admitted on June 5th, 1914. Patient was seized the day before with sudden acute pain in the abdomen in the neighbourhood of the umbilicus. He had a similar attack a few months before. He had always been a healthy man. The bowels had been regular, but he stated that he passed a little blood at times (probably from hæmorrhoids). He came in more or less under the influence of acute alcoholism. He said he had been drinking heavily to take away the pain. On examination his epigastrium was very rigid, and the abdomen was tender. He presented all the features of acute general peritonitis. My diagnosis was "perforated gastric ulcer." An incision was made in the middle line in the epigastrium, and a great deal of free pus was found in the abdominal cavity. This was traced to an abscess which had burst into the peritoneal cavity from the substance of the liver. The usual tube and gauze drainage was placed in the abdomen in the neighbourhood of the abscess cavity. An incision below the umbilicus was made for the drainage of the pelvis. The patient was placed in Fowler's position, and treated as in the other cases on returning to the ward. He has had an uninterrupted recovery, and is now walking about.

The object of this paper is to stimulate discussion. I have based my opinions on the subject after seeing and performing many operations on this class of cases, and, above all, after supervising their after-treatment, for some years past. The alteration that has taken place in the technique of operation and after treatment of diffuse surgical peritonitis has saved innumerable lives, and to me is one of the striking advances of modern surgery.

THYROTOXIC GOITRE AND ITS TREATMENT.

By **Sydney Pern, M.R.C.S., L.R.C.P. (Lond.),**
Melbourne.

I am to-night, through the courtesy of Dr. Stawell, showing a few cases of thyrotoxic goitre, the treatment of which I hope may interest you.

Before entering into these cases I am going briefly to put before you the reasons why I adopted this treatment. During eight years' practice in a goitrous district certain factors enforced themselves upon my mind, which influenced me greatly. The main points were these. Pregnant women suffering from thyrotoxic goitres are very liable to profuse post partum hæmorrhage; the blood clots very slowly, and the clot is poor in quality. The discharge continues for a long time, and always returns after getting up, and persists often up to 8 or 9 weeks, or even longer. This suggested a diminished calcium content of the blood. On going into the sources of lime available in food, it was found that the quantity taken into the system of these patients was below the average, as the conditions under which they lived prevented them from getting vegetables or fruit, and that in nearly every case of goitre the individual took no milk, the distaste for milk in a dairying district is well understood by any who have lived in one. The drinking water also provided no lime, and the soil they lived on in the majority of cases was very deficient in it. The great majority of these goitre cases show some thyrotoxic symptoms, some more and some less, and they gradually merge into the type of true Graves's disease. The remaining types show more or less degrees of hypo-thyroidism; cases which have undergone secondary changes are not included in this category. In accordance with these views calcium salts were employed in treating these cases, the lactate being the most efficacious; vaso-constrictors and bromides were employed in the more thyrotoxic cases. All the patients under treatment then showed great improvement. This was most pronounced in young people with goitre showing mild thyrotoxic symptoms, which in many instances vanished completely. They often put on weight in an amazing way.

Later on, when applying the same treatment to cases of a worse type the results were not so satisfactory, and the question arose, "Why in some cases do calcium salts have such a pronounced effect and not in others?" The idea that some absorbed more lime than others suggested itself. The investigations in connexion with this subject have revealed that calcium tends to combine with free fatty acid forming soaps, and that much depended on the kind of fat as to whether these soaps are easily absorbed or not. Unsaturated fats and oils, such as butter, olive oil, cod liver oil, etc., form soluble soaps, whereas the saturated oils and fats, such as beef or mutton fat, form insoluble soaps. The latter under certain conditions set up great irritation in the bowel causing intestinal sand and enteroliths. In his work on "Recent Advances in Physiology and Bio-chemistry," Leonard Hill states that: "By the action of the gastric and pancreatic lipases the neutral fat is split into glycerine and fatty acids. Some of the latter unite with the alkali of the pancreatic and intestinal juice, and form soaps. The bile has a dual function as a solvent. Firstly it acts as a solvent for lecithin and cholesterin, and so aids in the excretion of these otherwise insoluble bodies. Secondly it acts as a solvent in the intestine for

both free fatty acids and soaps, conferring entire solubility on the former and largely increasing the solubility of the latter. The solvent properties of the bile are chiefly due to the bile salts, but in the case of fatty acids and soaps the amount dissolved is greatly increased by the simultaneous presence of lecithin. As the supreme function of the bile salts is to render the fatty acids and soaps soluble, and fit for absorption, the utility of the reabsorption of bile salts—is obvious." These important discoveries show why it is the fat absorbing power of the intestine that is most seriously impaired either by the absence of bile or pancreatic juice. With the absence of the juice the unemulsified fats are not broken up till they reach the action of the bacteria in the large intestine, and then it is too late, for the solvent bile salts have been absorbed to a great extent. On the other hand, in the absence of the bile the fats are split up by the juice, but the fatty acids and soaps are not brought into solution.

Referring to Starling's Physiology, we find that the fat-splitting action of pancreatic juice is trebled by the addition of bile, whether boiled or unboiled. It also has the power of dissolving fatty acids and soaps, including the insoluble calcium and magnesium soaps. This solvent action is greatest in the case of oleic acid. Calcium plays another very important part in intestinal digestion. Hawk states that Delezenne claims that trypsinogen may be activated by soluble calcium salts. The process by which the trypsinogin is activated through the instrumentality of calcium salts is very rapid, and is designated by Delezenne as an "explosion."

Hustin (Arch. Inst. de Phyiologie, Liege, 1913, xiii., 2, 318) establishes as a result of numerous experiments the important facts that a pancreatic gland irrigated independently with physiological serum, blood or secretin solution gives no secretion; but irrigation with a mixture of blood and secretin gives an abundant secretion of clear liquid, containing trypsin, lipase and amylase. The author further states that secretin is used up in the gland in the impregnation of the pancreatic cell, in a manner that renders it sensible to the action of certain substances in the blood. The presence of calcium electrolytes is a third essential. So from this we can infer that calcium salts in certain quantities are beneficial for, if not essential to, the efficient functioning of the pancreatic juice, and if these are withheld for any length of time, or not ingested in sufficient quantities we might expect deficient pancreatic activity. We read of calcium salts being useful in pancreatic diabetes, their use probably being due to this action.

Having found that bile and fats were essential for the absorption of calcium soaps, these were supplied with marked results. The stools of one patient in the wards were watched for some days, and these showed on various occasions a much paler appearance than normal when on ordinary mixed diet. In milk nature seems to have combined the two elements, calcium and fat, ready for the intestinal secretions to act upon and absorb. For this reason bile salts and milk are prescribed.

Bile is used in tablet form. The tablets are coated with salol and varnish, as this enables them to traverse the stomach and become dissolved directly they reach the alkaline small intestine. Pig bile is used in preference to ox bile, as it is said to be more akin to human bile than the latter. Fat is supplied in the form of milk, butter, etc.

A few remarks here on duodenal digestion may not be out of place. The following statements have been made by Starling in reference to an experiment:—"Although only a foot intervenes between the duodenal fistula and the pylorie fistula, a great difference is observed in the character of the intestinal contents obtained in the two cases. The outflow from the duodenum being mixed with pancreatic juice, and the bile is yellow in colour and increased in amount. During its passage through the duodenum the carbohydrates of the food undergo considerable changes, so that even one foot below the pylorus we find that one-half to three-fifths of the carbohydrates have been converted into dextrose and sugar. On deducting the amount of juices which have been added to the food it is found that even over this short length of bowel absorption has taken place of about a quarter of the ingested food, about a quarter of the carbohydrates have been absorbed, and about one-eighth of the proteins." From the above it can be concluded that if there is any delay or diminution in the flow of bile or pancreatic juice the duodenal digestion would be seriously impaired, more particularly on account of the rapidity with which the food passes through it. Take for granted that a certain amount of carbohydrates and protein escaped the action of the pancreatic juice and bile, they are liable to become improperly metabolized lower down by the action of bacteria, and converted into oxalates and other harmful products. Cases of gross pancreatic inadequacy often present oxyuria, which also depletes the system of calcium. Another point in the treatment is the reduction of carbohydrates and sugar. In cases of exophthalmia goitre there is diminished tolerance to carbohydrates amounting in some cases to glycosuria, which obviously suggests pancreatic inadequacy. In digestive disturbances in the upper part of the bowel sugars are responsible for increased bacterial growth, with the formation of gases, and as irritation of this part of the bowel reflexly sets up palpitation and cardiac distress, this may in some degree augment the tachycardia already present in Graves's disease. The most noticeable results of the treatment are that the patients begin to improve quickly; they soon put on weight, the appetite improves, sweating stops, headaches disappear, and the heart-beat slows down. These cases are still improving every week. One patient who is not here to-night had a fairly large goitre. An operation had been advised. The goitre became so small that no enlargment could be seen, and the gland could only just be felt when the patient swallowed. As a great deal of the swelling of these goitres is due to vascular engorgement, they fluctuate a good deal, and

until the sympathetic nervous system has got back its right balance, the swelling will not go away. As soon as an equilibrium has been reached the enlargement in the majority of cases may be expected to diminish considerably. The cases shown to-night are not completely cured, but are in the process of cure, and the patients can do their own housework with comfort. I can assure you that they have changed remarkably in a very few weeks. To those who have had much to do with this kind of case, it will be obvious that in asking them to come here this evening they are being subjected to a very severe ordeal. You see them under the worst possible conditions, conditions which would be very trying to any nervous individual. They have been treated under out-patient conditions, and have not been kept in bed, but have rested as much as they could at home. Unfortunately one of these cases has had a set-back during the last 4 days; her son has decided to go to the front, and the thought of never seeing him again has got possession of her, which has upset her considerably.

Cases:

Case 1.—Miss H., aged 32; February 7, 1914. The patient had been suffering from thyrotoxic symptoms for six years. She had lived in Melbourne for 27 years. The family history does not contain any facts of importance. She complained of attacks of tachycardia, and very bad headaches, and was very nervous. Tremors were very marked, von Graefe's sign was present, and there was a certain amount of exophthalmia. Her pulse rate was 88. The thyroid gland was fairly large. Calcium lactate, in 10-grain doses, and pig bile in doses of 8 grains, were given three times a day. On April 20 the pulse-rate was 72. The patient seemed quite well; there were no attacks of palpitation. Her neck did not swell. No medicine had been given for two weeks. She slept well. She was persuaded to go on taking the medicine, and did so for a time, but during the last month she had been away from home, and neglected this precaution, as she felt quite well. The patient had been treated in the wards for a while with calcium lactate, but did not make any headway until bile salts were added. It is interesting to note that this patient had an ovarian tumour removed a few years ago.

Case 2.—Mrs. P., aged 52. Fifteen years ago a hydatid tumour had been removed from her liver. About a year ago she felt ill, the symptoms being dyspnœa and incapability of working. When admitted to hospital she was very ill, but would not remain in for more than a week. She has been attending the out-patient department since that time. Her card showed that she had shortness of breath, which became worse at night, heaviness across chest, very severe palpitation, and that she sweated frequently. She complained of frequency of micturition and tenesmus of the bladder. The physical signs were: A firm, hard, symmetrical enlargement of thyroid gland, tremor of hands, tachycardia, intense nervousness, and von Graefe's and Stellwag's signs. She was put on calcium salts and bromides for nearly a year, but made no appreciable headway. On May 22, 1914, she was put on fel. porci. and cal. lact. The apex beat of her heart was in the 6th space, 4¼ inches from mid-sternal line; the pulse-rate was 124. Since then she has been steadily improving in every way.

Case 3.—J. K. This patient had been under Dr. Dunhill's care four years ago for exophthalmic goitre, and had improved considerably. She was treated by Dr. Ostermeyer two years ago for goitre. On April 10, 1913, she complained of nervousness and inability to keep still. Her bowels acted well with the assistance of aperient medicines. She complained of anorexia. She slept fairly well. An enlargement of left lobe of the thyroid gland was made out. Tremors, nervousness and palpitation were also present. She presented signs of mental irritability, was very restless and emotional; would weep, and had delusions of persecution against her property and her person. The physical signs were as follows:—Heart: The apex beat was in the 6th space in the nipple line. A systolic bruit was heard all over the precordium. The second pulmonary sound was not accentuated. The pulse-rate was 102, and the pulse was of small volume. The blood pressure was low. From March 10, 1913, to May 5, 1914, she was treated with bromides, calcium lactate, and hydrobromate of quinine. After the latter date she was given 10 grains of calcium lactate and 8 grains of pig bile three times a day, as well as .some aspirin for a pain in her hip. She improved quickly in every way. On June 26, 1914, her pulse was 84. While she had previously been affected by violent muscular tremors, only slight persisted. She had also improved greatly as regards her mental condition.

Case 4.—Mrs. W., aged 44 years. This patient was born at Scarsdale, and lived there for 20 years. Later she had lived in Melbourne. Scarsdale is a goitrous district. About the age of 28 or 30 years she had noticed some enlargement of the thyroid gland, and was nervous and easily excited. Six months ago she had had an attack of influenza, and was in bed for three weeks. Up to the time of this attack she had been stout, but since then she had become thin. As a young girl she had never taken milk, as she had too much to do with it. She had had three children and one miscarriage. After the birth of the last child a bright discharge had continued for two or three months. She was anæmic for some time after. She has had mild thyrotoxic symptoms for the last 20 years. Five years ago she received a great shock; her sister was killed in the Sunshine accident, and she had to identify her. On the same day she was informed that it was necessary that her son should have his leg amputated. Within a week her hair turned quite grey. On examination she presented the signs of a typical case of Graves's disease, all the classical symptoms being present. She was so easily upset that the sweat streamed out when she was spoken to. The apex beat of her heart was in the anterior axillary line, 5½ inches from the mid-sternum, in the 5th space. There was impaired resonance one finger's breadth to right of the right border of the sternum. The

abdomen presented a swelling in right iliac fossa. The swelling was freely moveable. On vaginal examination it was found to be ovarian in origin. It was of the size of a large orange. She had had amenorrhœa for the last 18 months. She had been in the hospital for three weeks, and had been taking calcium salts. She had improved a little with the rest in bed, but on going out she was just as bad as ever, in fact she says that she was worse. She was then put on pig bile and calcium lactate. This caused great looseness of the bowels for a while, which was controlled with bismuth. She was told to rest on a couch as much as she could. She was forbidden to take sugar, and sacharine was substituted. Plenty of meat was ordered, and carbohydrates diminished. On May 4, 1914, she started with the bile salts. The pulse was 120, and at times 140. Within a fortnight she was greatly improved, and was well enough to help with the housework. Since that time she has gradually gone on improving. A daily record of her pulse was taken by her son. The pulse varied between 69 and 100 early in June. She used to get excited, which caused her pulse-rate to go up when visited by me. During May and June her pulse-rate had been between 65 and 85. The menstruation started again in June, after being absent for 18 months. On abdominal examination it was found that the ovarian tumour had vanished. She goes out for walks every day, and does a good deal of the housework. The heart-beat is stronger, and does not give her any trouble. The apex beat is in nipple line. She is much fatter, and feels quite well. She is improving every week, and it is to be hoped that she will still continue to improve till she is quite well.

Those interested in the subject of goitre are referred to a paragraph published in the "Medical Journal of Australia," July 25, 1914, page 82, in which the author seeks certain information for the purpose of collecting statistical data.—Ed.

Reports of Cases.

A CASE OF INFANTILE TETANY.

By **M. J. Plomley, M.B., Ch.M. (Syd.),**
Sydney.

Of five children born previously to Mrs. H., only one lived—the first-born. This boy was born healthy, and never gave any cause for anxiety, and at present is a fine lad of about 10 years of age. The fourth child—a girl—was stillborn and premature. The second child lived 14 days, the third nine days, the fifth six days. All these children were born apparently healthy, but symptoms appeared usually about the third day, and death occurred within gradually shorter periods with each successive child. Death was probably due in each case to the same cause, as the same symptoms appeared in all in the same sequence. I depend for this stated on the father, who observed each case closely and carefully from the beginning, and who certainly foretold several symptoms in the case recorded below. The symptoms were somnolence, indifference to food, pallor, peculiar gasping breathing, a cry as of pain, debility and death. Definite jaundice appeared in one case. All the babies were breast-fed from the first. The previous pregnancies were apparently normal, except that in one there was albuminuria. In the last pregnancy there was also some albuminuria, which cleared up under treatment. The mother was somewhat anæmic in the early months, but later she looked the picture of health. Labour occurred at full term, and was uneventful. The child, a boy, was large, well-nourished, and cried lustily. The cord was not tied until about 10 minutes after the birth, and to this I attribute the intense jaundice which appeared in 24 hours, and persisted for about six weeks, and which was associated with much bile in the urine and stools. The mother's breasts began to secrete on the second day, and the child suckled strongly, but in the beginning of the third day the drowsiness prophesied by the father appeared, and thereafter attempts at suckling became feebler and less prolonged. Before serious symptoms appeared, when the child was about 46 hours old, I noticed and commented on the extreme sensitiveness of the child to touch, however light, and a slight degree of spasm of the hands—to which, however, at the moment, I did not attach much importance. Seven hours later the father informed me by telephone that the child was going the same way as his predecessors. On examination I found that the condition was not satisfactory. The child was drowsy, rather dusky in colour, took the breast badly, and only for a few moments at each attempt at feeding. No physical signs could be detected in heart, lungs, or elsewhere to account for the condition. The fontanelle was not tense, but the skin was hyper-æsthetic, and the deep reflexes very active. Eight hours later I was told that the child was dying, but treatment was persisted in, and at my next visit the child was still alive. He lay rigid in his cot, gasping for breath. All the muscles seemed in a state of spasm, with exascerbations at frequent intervals. There was marked head retraction and opisthotonos. The heart beat slowly and strongly (about 130), but the respiration was jerky and spasmodic, as if the respiratory muscles shared in the general spasms. The colour was dusky, deepening with each spasm, and the face pinched and drawn. There was no cry, but an occasional peculiar almost silent gasp. Food was refused, probably because of inability to suck. Some toxic agent seemed to be at work. The temperature was raised on the third day of illness, and remained between 99° and 100° for some days. Under treatment the child began to improve, the spasms gradually disappearing, though Chvostek's and Trousseau's signs persisted for about 14 days, and the hands occasionally took up the typical position. In other respects the child behaved like a normal but weakly infant; it appeared to feel the cold, and became blue on the slightest exposure. After 12 days drugs were discontinued, and the child relapsed 24 hours later, only to improve again immediately treatment was reinstituted. Much weight was lost in the first weeks, and the gain in weight was not apparent till several weeks later, and then was slow. On the appearance of symptoms the child was taken from the breast, whey, albulactin and water being given. Later I prescribed weak peptonized milk. This method of feeding resulted in much intestinal trouble, curd and mucus appearing in the stools, with much flatus-pain and discomfort, and occasional vomiting. Breast feeding was then resumed, with gradual return of the child's digestion to normal. Drug treatment consisted in giving from the first adrenalin hydrochloride in small doses. Bromide and phenazonum were administered to check the spasms so long as the spasms lasted. The adrenalin was continued with diminishing doses for about 12 weeks. The child relapsed when the dose was much reduced after the first 10 days. Thyroid extract proved useless. Calcium lactate was also tried when symptoms recurred after 10 days, but without apparent effect. Small doses of brandy were found to be necessary during the illness, and more especially useful while the intestinal symptoms lasted. The diagnosis in this case was not easy. Reasoning from the history of the previous children, I assumed the presence of some maternal toxic condition, or some congenital abnormality or deficiency. As regards the first there was no sign of tuberculosis present. Wassermann's reaction was negative, and though albuminuria was present during two pregnancies yet it was absent in three. In all the pregnancies except one the mother appeared to be in perfect health, and especially during the last one. Again, gross abnormality could be excluded, as lungs, heart, bowels, etc., were apparently normal in the other cases. This in my opinion narrowed the case down to one of deficiency probably in the secretions of certain of the ductless glands, and it was on this theory that I had decided to work should the new-born child begin to fail. Symptoms appeared on the third day, when the material received from the mother had apparently been exhausted, no fresh sup-

plies being received through the maternal milk or manufactured by the infant. (The mother's milk was not administered after the third day, as it was thought possible that it might be a source of toxin). Administration of the extract of a gland (supra-renal), which is probably the most important of the ductless glands as far as life is concerned, was followed within a few hours by marked improvement. Stoppage of the drug resulted in relapse. Time was thus given to allow the infant's own glands to functionate, and that this has taken place is shown by the fact that now, three months after birth, the child is fat and well, has weathered a mild attack of bronchitis, and has discontinued his medicine, while for the last six to eight weeks only one minim of adrenalin has been given from once to twice daily. Neither blood nor urine was examined. Within the last few weeks I have read the copy of a report of the post-mortem made on the last child that died. The report appeared in the "Australian Medical Gazette," June 21, 1909, p. 303, under the heading "A Case of Congenital Lencocythæmia." It gives a full account of the family history, of the child, of the post-mortem examination, and the appearances of blood-films taken from the various members of the family and from the child itself. I should like to emphasize, however, that the latter were taken after a death following on partial starvation and physical exhaustion. The report also makes no mention of the general spastic condition which from the father's account must have been present.

TWO CASES OF APNŒA IN INFANTS.

By **W. F. Litchfield, M.B.,**
Sydney.

In the "Australasian Medical Gazette," Oct. 10, 1910, p. 544, Dr. Littlejohn reported a case of apnœa in an infant, necessitating artificial respiration a considerable number of times before recovery followed. I have recently seen two similar cases, and as the condition is not described in any text or other books at my disposal, and as the pathology of the condition is obscure, I thought their record might be useful. The first was a boy aged 5 weeks. He was admitted to the Children's Hospital on August 8, 1914, with the history of a cough for five days and attacks of cyanosis ("going black in the face") for 24 hours. He was a fairly plump baby. There were some scattered rhonchi heard over both lungs, but the temperature was normal. Shortly after admission he stopped breathing and became blue in the face. As he made no attempt to breathe after some seconds, artificial respiration was resorted to. After some minutes, shallow respirations occurred, and gradually the breathing became normal. The attacks, however, kept recurring at about hourly intervals, and a nurse had to be in constant attendance to perform artificial respiration. At the beginning of the attacks the breathing became fainter and fainter as in Cheyne-Stoke's respiration, until it finally ceased altogether. There was no obstruction in the respiratory passages whatever. The attacks continued for four days, when the child died, apparently from exhaustion. Oxygen inhalations and hypodermic injections of atropine were tried without avail. The lungs and heart were examined post mortem, but beyond some lobular collapse of the lungs, nothing abnormal was found.

The other case was a healthy breast-fed baby six weeks old. On August 8, 1914, she developed bronchitis, which improved under treatment. Four days later she developed attacks of "blueness," with cessation of breathing. Two days later the attacks became more frequent, and, in spite of artificial respiration, the child died. The attacks were similar to those described in the other case, and between the attacks the child appeared quite well. The brain, lungs and heart were carefully examined post mortem. The brain and heart were normal. The lungs showed on each side areas of collapse along the posterior border, but otherwise there was no disease.

The causation of these cases of apnœa is not clear. The symptoms suggest a central origin, but in the post mortem examination of the last case the brain appeared to be healthy, and there was no excess of fluid at the base or in the ventricles.

Reviews.

HORMONES.

The literature of organo-therapy has grown so immense in the last 10 years that any work which attempts to collate the articles on this subject should prove very welcome to the practitioner. Dr. Harrower has not, as the title of his work (1) would seem to indicate, restricted himself to the therapeutic uses of the hormones alone, but has also entered into the medicinal uses of various extracts of organs which cannot claim to belong to this class. The earlier portion of the book is devoted to general considerations, the term hormone is defined, and the principles underlying hormone therapy are definitely presented, whilst the phrase "balance of the internal secretions," which we owe to the French school, is fully discussed.

A complete exposition of the action of the various hormones peculiar to the digestive system is given. The thyroid, parathyroid and thymus extracts are considered under the heading of the metabolic glands, whilst the chromaffin system and its hormones are discussed in association with the hypophysis and epiphysis, under the heading of the nervous system. The various hormones peculiar to the testes and ovaries, together with the prostatic and mammary extracts are considered in a separate chapter. Lymphatic gland extract and pulmonary opo-therapy are discussed, whilst the use of pluri-glandular extracts and the treatment of diminished internal secretion are treated at full length. The final chapter is devoted to a glossary of terms, a dose-table, and a list of references to the literature.

The author makes no claim to orginality, and presents a considerable amount of unconfirmed and debatable matter as if it had the same title to confidence as some of the best authenticated work on the subject. Nevertheless his work is worthy of high commendation, inasmuch as it affords a comprehensive survey of the immense amount of work which has been carried out on this subject of late years. It can be confidently recommended to the reader who desires to consider from the therapeutic standpoint a subject which has been so ably presented in its more purely scientific aspects by Biedl and Swale Vincent. From these authors, especially the former, he draws very largely, but it is to be noted that in his consideration of the pancreatic functions he assigns to the islets of Langerhaus the specific function of forming the internal secretion. This is in direct opposition to the most modern views.

Hospitals.

HOSPITAL SATURDAY AND SUNDAY FUND, VICTORIA.

Sunday, October 25, 1914, was Hospital Sunday in Melbourne. It was feared that the financial depression, consequent on the state of war, would effect a material reduction in this year's contributions, but considerable satisfaction is being expressed at the results of the collections in the churches and elsewhere. The Presbyterian Churches head the list with £1708, while the Church of England contributed £1241. The total, including sums collected by the Honorary Secretary of the Hospital Saturday and Sunday Fund, of £2785, amounted to £9062.

The Hospital Saturday and Sunday Fund of Melbourne commenced its activity in 1873. The methods employed were collections in the streets and in churches. In 1888 the sum of £12,482 was collected. It appears that this unusually generous amount was due to the great prosperity of that particular year. The receipts fell to a low ebb during the nineties, and then gradually crept up to between £7000 and £9000 in the first decade of the present century. In 1911 and 1912 the totals exceeded £11,000. In 1913, £8526 were collected in the churches, and the total amount reached £10,786. As stated above, the amount from all sources counted up to the night of Hospital Sunday, totalled £9062, and from the sums received subsequently, there is good prospect that this year's collection will reach £11,000.

(1) "Practical Hormone Therapy," by H. R. Harrower, M.D.; 1914, London: Bailliere, Tindall and Cox. pp. 488, Demi 8vo. Price 15s.

Medical Journal of Australia.

SATURDAY, NOVEMBER 7, 1914.

To Those Who Stay at Home.

A few weeks ago an appeal was made to the members of the medical profession in Australia to offer their services in the common cause of humanity and in the spirit of Empire. The response was beyond all expectations. Medical practitioners never turn a deaf ear to appeals for whole-hearted sacrifice, and are never blind in the presence of real want. The Commonwealth has asked the profession to spare one-tenth of its number for service both at the front and at home, and the individual members in their private capacities have offered even more than was asked for. In addition to this response, the individual members have listened to the general appeals directed to the public, and have given generously to the various funds for the relief of our troops and their dependants.

In spite of the fact that a great deal has been done already by the members of the profession, a further appeal is being set afoot which will not be pleaded in vain. The British Medical Association has long since received official recognition as being truly representative of the whole profession in the Commonwealth. The membership of the Association is a valuable asset to a practitioner, and secures for him social and material advantage. But privileges cannot be enjoyed without the incurrence of duties and obligations. The Federal Committee of the Association has realized that in its corporate capacity the British Medical Association, up to the present, has not offered the country any tangible proof of its loyalty. Individual members have done a great deal, but the example of numerous other professional and trade organizations suggests that the Association as a whole should place some suitable instrument into the hands of the military authorities. It has been felt that the generosity and patriotism of the British Medical Association should be directed toward the relief of suffering, and toward the saving of lives in the line of fighting. The Federal Committee proposes to make a suitable presentation to the Army Medical Service to lighten the labours of the Corps engaged in looking after the wounded.

We are informed from an authoritive source that motor ambulances are required for the campaign. Each well-equipped motor ambulance costs about £1000, while X-ray outfits, which could be placed in an ambulance of this kind, costs about £600 extra. The Federal Committee has not yet determined the exact form of the presentation. This will depend to a certain extent on the response made to its appeal. The machinery that will be utilized will be that of the constituent Branches, with a central collecting bureau at the secretariat. There are approximately 2500 members in the Commonwealth. Some 250 of these have volunteered for personal service, and will therefore not be expected to contribute unless they feel especially disposed to do so. It is hoped that the greater number of the remaining 2250 members will regard it a duty to subscribe to the British Medical Association (Australia) Military Motor Ambulance Fund, each according to his or her means. In the past, the response to direct appeals made by the various Branches for various purposes have resulted in a contribution from something like 33 per cent. of the members. In the present instance, the response will, we feel confident, be nearer 100 per cent. Since the material condition of the members varies in every case, and since the effect of the financial depression must be variously felt in different districts, it is impossible to forecast what the amount of the contributions will be. We can therefore only speak individually to each and every member of the British Medical Association, and ask him or her to send as large a donation as can be afforded to the Fund, in order that the gift of the medical profession, through its corporate representative organization, may be worthy, generous and useful. Medical men are notoriously opposed to waste in respect to managerial expenses. In order to reduce the cost of collection to a minimum, members are requested to forward their subscriptions in the form of postal notes or money orders rather than in the form of cheques to Dr. G. H. Abbott, the Honorary Secretary of the Federal Committee, B.M.A. Building, 30-34 Elizabeth Street, Sydney. In this way the charges made by banks for the collection of the amounts of cheques payable in other States will be avoided, and the amount which can

be devoted to the purpose for which it is collected will be all the greater. The Honorary Secretaries of the various Branches have been requested to lend their services in the interest of the Fund. The growth of the amount will be published in the "Medical Journal of Australia" each week until the Fund is closed, and we hope that within a short time, it will be our pleasant duty to thank a large proportion of the members for a generous response to this appeal.

MILITARY MEDICINE.

Among the cables received from the theatres of war in Europe, which have been published within the past few weeks, some have dealt with the outbreak of certain infective scourges. It is at the present moment impossible to state how far these reports are reliable, and in the absence of very definite information it will be well to keep an open mind. Alarmist rumours of all kinds are very plentiful. It is, however, extremely probable, in spite of the precautions which are known to have been taken by the sanitary services and medical corps with each of the armies engaged in the war, that a considerable amount of epidemic sickness is present among the troops. It must be remembered that the gigantic German Army has split itself into two great segments, and, together with Austria's large forces on the one side is opposing millions of Russian troops, and on the other is struggling with the full strength of the French and Belgian armies and a considerable number of British regiments. These millions of soldiers, living and dying on the field, in trenches, under insanitary conditions and in devastated and ruined cities and villages, form a most fruitful soil for the outbreak of diseases, such as cholera, typhus, dysentery, small-pox, enteric fever and plague. The more southern districts, where troops are engaged, are well-known to hygienists as places where several of these diseases are more or less endemic. Added to the list already given may be some of the tick-carried diseases, the spirochætoses, and possibly some of the mosquito-borne ones, but for the present purpose it will be found advisable to limit a discussion of the modern prophylactic and therapeutic measures to the six more common and likely diseases. Medical officers serving with the medical corps will be called upon to deal with some or all of these diseases, and the rest of the medical profession will take more than a mere academic interest in the most serious aspect of war. In the past infective diseases have accounted for more deaths among troops engaged on the field than bullet wounds or shell fire. In times of peace these diseases may be regarded as preventable, but under the conditions of a campaign, the practice of prophylactic medicine is more difficult to carry out and the spread more difficult to check.

Cholera.

In order to understand the problem of the prevention and successful treatment of cholera, it is necessary to cast a glance over the epidemiology of the disease, and to consider what modern research has taught in regard to its ætiology. In 1883, Robert Koch isolated from the excreta of persons suffering from cholera a vibrio, which is now universally recognized as the causal agent of the disease. The experiments were conducted in Egypt, and later in India. The same vibriones were also found in the intestine of persons who had died of the disease. Koch sought the vibriones outside the human body, and found them in a tank used for storing drinking water. Numerous investigations since that time have confirmed his observations and deductions, and it is now recognized that cholera is transmitted by the contamination of water and food with bacteria from the stools of the patients.

The prophylaxis during peace naturally consist in the prompt notification and isolation of every case at an early stage in the disease, in the disinfection of the excreta, in the protection of water used for drinking or domestic purposes against contamination, and in the proper construction of house and town drainage. Where an efficient hygienic control is difficult to carry out, preventive vaccination is used. This method is also relied on by bacteriologists, medical practitioners, and nurses who deal with cholera patients. Ferran first suggested the employment of prophylactic injections of vibriones. He made bouillon cultures from the stools, and in all probability did not use pure cultures. Haffkine

introduced, in 1892, the first practical method of vaccination. His method consists in the injection of vaccine 1, an attenuated living bouillon culture, in doses of 0.5 c.cm (corresponding to about 5 mgrs. of vibriones) for an adult. The attenuation is attained by growing the vibriones in broth, through which oxygen was conducted in a constant stream. The first injection is followed by a second injection after an interval of three days. Five days later dead vaccine is given, the dose being 1 c.cm., i.e. 2 mgrs. of vibriones. The vibriones are highly virulent, the virulence having been raised by repeated passage through guineapigs. Haffkine calls these strains "virus fixe." The first living culture causes a fairly well marked reaction, consisting in redness, swelling and pain in the site of injection, fever, and headache. As a rule the reaction is less marked after the injection of the killed vaccine. After five days, full immunity is said to have developed, and this immunity is supposed to last for about a year.

Kolle demonstrated in 1894 that Haffkine's theory was untenable, inasmuch as guineapigs, which were immunized with cultures of moderate virulence, were protected as readily as if they had been subjected to Haffkine's complicated vaccination. Haffkine had stated that virulent organism produced local necrosis after the first injection, but this contention was found to be erroneous. Kolle, therefore, used virulent vibriones, and prepared his vaccines by emulsifying an agar slope culture, well grown, in 10 c.cm. of physiological saline solution. Sterilization was obtained by heating to 58° C. for an hour. Each cubic centimetre is supposed to contain approximately 2 mgrs. of vibriones. 0.5 per cent. of phenol is added. Immune bodies are detected in the serum of persons injected after four days, but full immunity is not produced until the lapse of 12 days. The reaction corresponded to the size of the dose. A second injection of 4 mgrs. is usually given after a week. During the past nine years various authors have published a great variety of statistics dealing with the result of these preventive inoculations. In all these statistics it has been clearly shown that the incidence of cholera after vaccination is very materially reduced, and the mortality of those who, nevertheless, have contracted the disease, is very low.

The signal success attending Haffkine's and Kolle's researches naturally gave rise to hopes that a specific treatment could be discovered. A large number of attempts have been made, but according to the records published up to the present, not one has proved itself of value. For a time, a heated controversy took place as to whether the vibriones produced a true toxin, or whether, like the typhosus bacillus, they caused toxic symptoms in virtue of their endotoxins. Kraus worked with the so-called El Tor toxin, while Ransom, Metschnikoff, Roux and Salimbeni and Brau and Denier worked with bouillon cultures. On the other hand, Macfayden and Hahn employed the bacterial substance. The former ground the vibriones in a frozen condition, and extracted with potassium hydrate, while the latter subjected agar cultures to autolysis. Kraus published an exhaustive account of the results of the various sera and bacterial products in the treatment of cholera, and showed that satisfactory results had not been obtained in any instances.

At the present time a treatment devised by Leonard Rogers is in general use. The results appear to be good, but caution is needed in the valuation of this, as well as of other, forms of treatment. The treatment consists in the injection of a hypertonic saline solution, either under the skin or into a vein, and the exhibition of permanganates. The solution for injection is composed of 120 grains of potassium chloride, 6 grains of sodium chloride, and 4 grains of calcium chloride to the pint of distilled water. Rogers recommends intravenous injection, save when the blood pressure is high. When the plasma is markedly concentrated, he insists on intravenous application. Four pints is the usual quantity given to an adult. A single injection is said to be sufficient in the majority of cases, but if collapse returns, the injections may be repeated. The injection is carried out by tying a small silver cannula, provided with a stop-cock, into the median basilic vein, and allowing the solution to flow in through a rubber tube and the cannula from a graduated glass vessel by gravity. The rate of flow is controlled by raising or lowering the glass receptacle. Rogers prefers calcium permanganate to the potassium salt, because it is less astringent. He employs a solution of from 2 to 6

grains to a pint of water, and directs the patient to drink freely of it. In addition, he gives potassium permanganate pills in doses of 2 grains every quarter of an hour for the first three hours, and then every half hour until the stools become smaller and greenish, which usually occurs in about twelve hours.

Typhus Fever.

The parasite of typhus has not yet been discovered. This fact renders the whole question of the prophylaxis and treatment of the disease difficult. It is true that Gottschlich described, a few years ago, certain cell inclusions, which stained well with Romanowsky's stain, and which were endowed with the power of spontaneous movement. He regarded these inclusions as protozoa, and believed them to be the causal organisms of typhus. These observations have not been confirmed. In spite of the fact that the ætiology of the disease is not fully understood. Weissbecker claims to have achieved astoundingly good results with the serum of convalescent patients. The method has not found support or approval either by English or by German scientists.

The fact that typhus, or gaol or famine fever, as it used to be called, is associated with dirt, overcrowding, insufficient and unwholesome food and insanitary surroundings, has led to the suggestion that the cause of the disease is carried by means of some form of skin parasite. Investigations have revealed the fact that the disease is spread by pediculi. In the absence of any biological knowledge beyond this, and of any successful method of treatment, hygienic measures have been successful in Great Britain in stamping out this disease. It persisted in Dublin after it had disappeared from London; it is still met with in parts of Russia, Hungary, and Italy.

In warfare, once typhus breaks out, it will continue to spread among large armies, because body lice are found on the men in the trenches. This is not necessarily the fault of the soldiers. On the other hand, the troops should be free from pediculi before going to the front. We are informed that our men, now in camp, are infested to a considerable extent. It, therefore, follows that one of the essential prophylactic measures against typhus would be a skin inspection of the troops during the period of training. This should be undertaken on parade, so that the shame of the discovery of body or head lice would be acutely felt. It is to be hoped that before the second and third Expeditionary Force leaves our shores, the vests and skins of every soldier will be thoroughly searched for these nasty parasites, and the source of transmission of typhus cleared out.

In the trenches men should be instructed to examine their vests carefully, and on discovery of the first louse, to apply ointments or other means to get rid of their uncanny guests.

Dysentery.

Dysentery has claimed the attention of bacteriologists for a number of years, and the ætiology of the disease is now fairly well understood. The disease occurs in two forms, each due to a separate class of organism. Amœbic dysentery was shown by Loesch, Koch and Gaffky to be due to an amœba, which penetrates the epithelial layer of the intestine. Schaudinn studied this organism, and gave it the name of Entamœba histolytica. Infection takes place by means of direct contact, or possibly by the contamination of water and food. This form is not likely to create any special demand on the activities of the hygienist in the field of battle, and need not occupy our attention in this place.

The bacilliary form is caused by a bacterium, described by Shiga and Kruse, and known as the bacillus dysenteriæ Shiga-Kruse. In practice, the classical characteristics of this bacillus are not always observed, and, according to some bacteriologists, the variations in behaviour in culture on sugars and other nutrient media should be regarded as true variations of the organisms. It is, however, very unlikely that the pathogenicity of the different strains of dysentery bacilli differs more than does that of other well defined micro-organisms. This form of the disease is spread by the contamination of food, water, ordinary household objects, and possibly by direct contact. An intermediate host is not known.

While the ordinary epidemiological measures suffice in a free population to stem epidemics, much difficulty is experienced in asylums when the disease once gains an entrance. From this fact, as well as from numerous observations, it appears that the most important factor in the prevention of the disease is the proper treatment of the stools. In this respect,

dysentery is very like enteric fever. The peculiar position of the soldier in war renders it almost impossible to apply an adequate disposal or disinfection of the excreta. It is, therefore, absolutely necessary to resort to immunizing processes for the protection of the soldier.

Kruse first suggested an active immunization by means of killed bouillon cultures of the bacillus. Shiga discovered that this procedure was frequently followed by very severe reactions, and even by suppuration, and he, therefore, modified the method by grinding the bacilli into a fine powder, and suspending the powder in an immune serum, gained by the injection of the bacilli in increasing doses. This method was entirely successful. No marked reaction followed; but the immune bodies were formed just as well as with the ordinary vaccine. In his mass protection in Japan, Shiga was able to reduce the mortality from dysentery to practically nil. At the present time, both active and passive immunization are employed. Kruse's second method of injecting immune serum alone in increasing doses is said to be effective, and is certainly less troublesome than Shiga's method of giving first the bacilliary powder with the serum, and later the bacilliary powder alone. It is, however, probable that Shiga's method is the more reliable.

It is doubtful how long the immunity to dysentery lasts. In any case, it does not lie within practical measures to vaccinate a soldier proceeding to the war against a dozen diseases. Since vaccination against small-pox and protective inoculation against enteric fever are necessary, it will be found advisable to bear in mind the possibility of protection against the other diseases, and to rely on the carrying out of protective inoculations in the field, should a serious danger of the spread of one or other of the diseases occur. Moreover, it must be remembered that there is a danger of anaphylactic symptoms occurring if too many protein injections are resorted to.

The military physician is not helpless in the field or base hospital if dysentery breaks out among the troops. He has certain means of treatment which have proved of value. In the old days ipecacuanha in large doses was said to be highly efficacious. It is probable that it did good. To-day it has become fashionable to employ emetine in its place. Rogers claims for this alkaloid an almost specific action in the disease, and contends that its use effects a great reduction in mortality. This may be so, but it would be wiser to accept this enthusiastic opinion with a little reserve, and to anticipate a good, but not a wonderful, result from this medicinal treatment.

During the past ten years numerous bacteriologists have introduced different forms of serum for the treatment of dysentery. Kruse's method consisted in injecting into donkeys or horses fresh agar cultures of the killed bacilli, at first subcutaneously, and later intravenously. Rosenthal, Doerr, Vaillard and Kolle have employed slightly different methods. The chief point in regard to the sera is that they contain anti-infectious, as well as anti-toxic substances. Several of the sera now produced have both constitutents in satisfactory quantities. An interesting discussion on this subject took place at the International Congress of Medicine at Lisbon seven years ago. While each producer of immune sera claimed a remarkable reduction in mortality as a result of his treatment, the only fact that transpired clearly from the data produced was that the majority of the sera apparently shortened the course of the affection in the chronic forms, and influenced obstinate acute infections favourably. One or other of these sera are worthy of a trial in cases which resist medicinal treatment, or do not clear up satisfactorily under good nursing and careful handling.

Vaccination with killed cultures, according to Shiga and Kruse, are also recommended. It is stated that vaccines should not be given in acute cases before the 21st day, but this warning has been disregarded by a few clinicians without disaster. The strains employed in the preparation of the vaccines are often varied, every available type (Shiga-Kruse, Flexner, Y bacillus and Hiss) being used. It is probable that this precaution is a wise one, although the immunizing power of each type is identical to that of any other type. The dosage usually employed is a ¼ of a lethal dose for rabbits weighing from 1000 to 1500 grammes. Many vaccines are prepared to contain 2½ minimal lethal doses per cubic centimetre. The second dose should be double that of

the first, the third three times, and the fourth four times. Each dose is given ten days after the last one. The clinician should be on his guard when employing vaccines of this kind. Each dose is followed by some increase of the diarrhœa, and even of the blood and mucus in the motions. At times these symptoms may be very severe. The treatment has given good results in the hands of some observers, and should be employed when other means fail. We doubt whether the suggestion of giving an injection immediately the symptoms appear in all acute cases should be acted on.

Small-pox.

The question of the prophylaxis of variola is a closed chapter, and need scarcely be treated in a medical journal at the present day. While the nature of the parasite causing this disease is not definitely known, we have long since had in our possession a means of effectually checking the spread. We have had occasion to deal with an enquiry which is now being prosecuted in Melbourne, and need add nothing to what was then stated. Vaccination is being insisted on for all British troops proceeding to the front, and a neglect of this measure would be little short of criminal.

Enteric Fever.

The bacillus typhosus was discovered by Koch and Eberth in 1881, and was first cultivated in 1886 by Gaffky. Of its cultural and morphological characters nothing need be said in this place. A few facts in regard to these bacilli may be of use in connexion with the preventive measures to be employed. In milk they are killed by heating to 65° C. for 5 minutes. They die as soon as the pabulum containing them shows an acidity of from 0.3 to 0.4 per cent. within 24 hours. They are removed almost quantitatively from milk by centrifugalization, the bacilli being entangled in the cream, and rising to the surface. They live for about 8 weeks in rivers and about 5 weeks in sterile water. In sludge they have a longer life. Oxydation is peculiarly inimical to their existence. When thrown up in the form of a fine spray they die within a few hours. On the other hand, the bacilli resist the action of extreme cold in a remarkable manner. Brehme kept them frozen for 140 days, and was able to prepare sub-cultures at the end of this time. Macfadyen and Rowland, in their well-known experiments with the freezing of typhoid bacilli in liquid air, also demonstrated the remarkable resistance to low temperatures exhibited by bacillus typhosus.

The problem of enteric fever during warfare is different from the problem in ordinary life, especially in well drained and healthy cities. In the country districts in Australia, where the very elements of sanitary hygiene are neglected to a surprising extent, another factor enters in this connexion, namely, that of the common house fly and of the antiquated and inefficient pan system. On the field of battle and in devastated towns and villages, enteric fever is spread by the inevitable exposure of the excreta, the inevitable contamination of drinking and washing water, and the soiling of the persons of the combatants. Moreover, the wounded and the men who are living on short rations, exposed to rain and cold in the trenches, form a peculiarly suitable and fruitful field for infection. Precautions, such as the boiling of water for drinking purposes, attempts at cleanliness and avoidance of excesses may do a certain amount in diminishing the spread, but cannot check it. It, therefore, becomes absolutely essential to resort to prophylactic inoculation. We have already dealt at some length in the "Medical Journal of Australia" (September 5, 1914), with this subject. The inoculations are able to diminish incidence and to reduce mortality to a considerable degree, and are, therefore, necessary, side by side with vaccination against small-pox, for all troops going to the theatre of war.

Plague.

The sixth disease mentioned in our list is plague, a disease which has engaged the serious attention of the medical world for a number of years. The significance of this disease to the British Empire, especially in India, has necessitated the taking of extraordinary means to investigate the cause of, the methods of spread of, and the possibility of wholesale immunization against, plague. Aetiologically, plague may be described as a disease produced by a bacillus pestis, which was discovered by Kitasato and Yersin in 1894. The bacilli having gained an entrance into the human body set up a septicæmia,

which is frequently localized in a sort of quasi-pyæmic form, the bubonic form, or which finds expression in a more or less extensive pulmonic inflammation, the pneumonic form. The work of the British Plague Commission, and also of the German Commission, brought a number of highly important facts to light. It is now accepted that in bubonic plague, the bacilli in the peripheral blood are sucked up by Xenopylla cheopis and other fleas, and carried on to rats. Here the infected fleas infect their comrades, and under certain conditions they may leave their natural hosts to suck human blood again, and thus give rise to fresh human cases. The bacilli multiply rapidly in the cadavers of rodents, and the danger of infection to man in districts where large numbers of rats prevail, is very great, in spite of the comparatively small affinity of the rat flea for human beings.

In the case of pneumonic plague, the method of spread may be by direct inoculation, such as occurs in laboratory accidents, by inoculation by fleas producing septicæmia with secondary localization in the lung, or by inhalation from another case of the same nature. Bacilli are freely sprayed into the air by persons suffering from pneumonic plague and those attending to the patient are in imminent danger of contracting this particularly virulent form of the disease by the inhalation of the sprayed material. It is intensely infectious, and every practitioner or nurse who comes into contact with patients of this kind should adopt the precaution of wearing a mask or gauze covering to protect the mouth and nose, and suitable glasses to protect the eyes. All abrasions should be covered with collodion or other dressings; and all clothing, drinking vessels, or similar objects, should be disinfected immediately they are removed from the patient.

In view of the deadly nature of the infection and of the various methods by which the disease may be spread, it is particularly unfortunate that the immunity which follows prophylactic inoculation only lasts for a comparatively short time. On the other hand, prophylactic inoculations are rarely required for any length of time, save in countries where cholera is endemic. In the field of battle, sporadic outbreaks of cholera may occur in certain districts and for a limited time. The protection afforded may suffice to tide the men in the trenches or in other crowded places during a battle over the period of danger.

Passive immunity was tried by both Yersin and Lustig, who used the serum of animals previously treated with dead plague bacilli and their products. It has, however, been shown that the duration of this passive immunity is extremely short, and may be but a couple of days. Haffkine first employed an active immunization. His vaccine is prepared by inoculating flasks containing bouillon with a layer of butter fat with the bacilli. The growth takes place in stalaktite form into the depth of the broth. The flasks are incubated for about one month, during which time they are shaken on six occasions, to deposit the colonies at the bottom of the vessel. It is necessary at this stage to test the cultures, and if they are found to be pure, the whole fluid is heated to 70° C. for one hour, and then well shaken prior to bottling into small bottles. The doses given are from 2 to 3.5 c.cm. of this bouillon culture. A fairly severe reaction, signalized by high fever, is usually noted after injection. Immune bodies appear within 24 hours of inoculation, but their appearance is by no means constant. Haffkine's vaccine has been largely used, and is regarded with favour by many observers. Pfeiffer and Calmette have objected to the process employed, on the ground that the cultures tend to become attenuated, and that such cultures do not produce anti-bacterial substances in reasonably large quantities. Lustig and Galeotti prepared a vaccine by culturing the bacilli on agar plates, and then treating the growth with 1 per cent. potassium hydrate solutions. Solution takes place in about 3 hours. From this solution the nucleoproteid is precipitated by the addition of 1 per cent. solutions of acetic acid. The precipitate is carefully washed and collected. Five mgrs. of this active substance are said to suffice to immunize human beings. Terni and Bandi prepared a vaccine by collecting the peritoneal exudate of guineapigs infected intraperitoneally with plague. This exudate is sterilized fractionally by heating to 50° on several occasions. Lastly, Hata, Albrecht and Ghon have utilized living bacilli pestis as a vaccine. Lustig and Galeotti's vaccine was used largely in the Manchurian campaign, with apparently good results. Strong used attenuated cultures, and claims to have obtained striking results. It appears that each of these vaccines have yielded good results in the past, and should be resorted to in Europe if plague occurs among the troops.

Lastly, it is necessary to mention that both Lustig and Yersin employed the sera tried for passive immunization in the treatment of plague. Lustig immunized horses with his active substances, and a definite therapeutic effect was obtained with the serum if employed in the early stages of the disease. A marked reduction in mortality (of approximately 11 per cent.) has been registered in Bombay, as a result of its use. Kitasato has also prepared a serum, which is said to be of value in the treatment of the disease.

Abstracts from Current Medical Literature.

PÆDIATRICS.

(183) Intra-muscular Injections of Antitoxin.

Rolleston and Macleod (Brit. Jour. of Children's Diseases, July, 1914) report a series of 261 cases of diphtheria treated by intra-muscular injection of varying amounts of antitoxin. The method consists in painting the outer side of the thigh in its middle third with 2 per cent. iodine solution, without any previous washing of the skin. The syringe needle is plunged deeply into the muscle, and quantities up to 50 c.cm. or even more injected. The site of the puncture is then painted with iodine, and collodion is applied. The thigh is preferred to the abdomen as injection here does not hinder the necessary examination of the liver. The situation is better than the gluteal region, since there is less danger of injuring vessels and nerves, and since the thigh muscles are much more compact, and exercise greater pressure on the injected fluid, thus effecting more rapid absorption. Intra-muscular injection is quite as simple as subcutaneous, the actual injection is less painful, and the subsequent pain and tenderness is less marked, or may be absent altogether. The subsequent concentration of anti-toxin in the blood is fairly high and uniform for several days, whereas 24 hours after intravenous injection the anti-toxin has disappeared to a great extent. As regards the rapidity with which membrane disappeared from the fauces or laryngeal symptoms subsided there was no appreciable difference between the subcutaneous and intra-muscular methods. Albuminuria appeared in about the same percentage of cases, but in the reported series there was a comparatively low rate of paralysis, especially of a severe type, and the mortality was only 5.7 per cent. in spite of the presence of a large number of severe cases.

(184) The Schick Reaction.

Park-Zingher and Serota (Arch. of Pædiatrics, July, 1914) affirms that only those individuals contract diphtheria who have no anti-toxin, or only a minute amount, in their blood and tissues. The Schick reaction is a simple clinical test, which depends on the local irritant action of minute quantities of diphtheria toxin when injected intra-cutaneously. If anti-toxin is absent, or present only in very small amounts, insufficient for protection, a positive reaction will appear in 24-48 hours (the details of test appear in the original paper). After testing 700 patients the authors consider that

(1) the Schick reaction serves as a reliable and convenient index of the susceptibility or non-susceptibility of individuals to diphtheria;

(2) and as an accurate clinical test to determine the efficiency of active immunization with mixtures of diphtheria toxin and anti-toxin;

(3) with a purulent or sanious nasal discharge showing the Klebs-Loeffler bacillus, a negative reaction excludes clinical diphtheria, and a positive one leaves the diagnosis of clinical diphtheria still a probability. In the first instance the patient is a carrier;

(4) by its means further experimental proof is added to the clinical experience that very toxic cases of diphtheria require the early intra-venous administration of large doses of anti-toxin;

(5) and the results obtained in families seem to point to other causes in addition to bacterial infections with virulent diphtheria bacilli, as determining factors in the production of natural anti-toxin.

(185) Treatment of Acute Nephritis in Children.

Renault and Laginet (Ann. de Med. et Chir., July, 1914) point out that the main indications for treatment are to relieve the renal congestion, increase diuresis and stimulate the elimination of toxins by the skin and bowels. Dry or wet cupping or leeches over the kidney region should be used to relieve congestion. Wet packs, hot air, or vapour baths, or even baths at 38° C. for 15 minutes act on the skin. The use of diuretic drugs is associated with some danger, and may be replaced by suppression of salt, and reduction of liquid, together with infusions of cereals, onions, uvæ ursi, and grape juice, etc. Calcium chloride in small doses is useful in helping to remove the chlorides which are retained in this disease; while to increase the nitrogen output lactose (10 to 50 grams a day) may be given, or subcutaneous injections of glucose, 20 c.cm. of a solution of 1 in 200. Dried kidney substance may be given in doses of 0.001 gram a day for each year of age. Syrup of buckthorn is a useful purgative. Acetate of ammonia is by far preferable to pilocarpine as a sudorific. Vegetable broths, cereals and milk may all be given, but if the latter disagrees with the digestion, cereals and rice; potato, carrots, lettuce, peas, sugar, or fruit may also be employed. With the disappearance of the œdema salt may be given in small quantity, and later on poultry, eggs, etc. Complete rest in bed is necessary at first, and the nose and throat must be carefully disinfected. For hæmaturia the authors recommend calcium chloride, or such astringents as tannin, or ergot. Where the hæmorrhage is excessive they give adrenalin. Two drops of tincture of cantharides are recommended for suppression of urine. Decapsulation should be tried as a last resort. They give chloral and bromides and perform lumbar puncture when convulsions are present, and digitalis and squills for failing heart. Where diphtheria is the cause, anti-toxin must be given, and if the patient is syphilitic mercurials should be employed.

(186) Bacillus Coli Infections in Infancy.

W. Morgan Hartshorn (Medical Record, August 15, 1914) summarizes his observations on the importance and variety of bacillus coli infections in early life, as follows:—In children the bacillus coli may invade the nervous system, causing a meningitis indistinguishable clinically from other forms. It has been found in pure culture in diseases of the respiratory tract. It may produce a septicæmia as in Winckle's disease, and has been found in acute catarrhal conjunctivitis. It doubtless acts with other organisms of its group in diseases of the intestinal tract. In the genito-urinary tract the bacillus coli may be the cause of enuresis, cystitis, pyelitis and pyelonephritis, these conditions accounting for many of the previously unexplained high temperatures, with severe constitutional symptoms. As the course of a pyelitis is frequently protracted, and as there are often exacerbations of symptoms after apparent recovery, the treatment must be persisted in, and should be continued until the urinary findings are normal. The most satisfactory treatment appears to be in the use of alkalies or the guarded use of hexamethylamine in increasing doses. Vaccine treatment of pyelitis should be considered, especially in obstinate cases, when other methods have proved unsuccessful.

(187) Vaccine Treatment of Pertussis.

J. and H. Campos Fillol (Policlinica, 1914, II., p. 239) used this treatment in 14 children, aged from 15 months to 7 seven years, and in one adult aged 30. The best results were obtained with autogenous vaccines, in doses of 50 to 100 millions, according to the age of the patient and the duration of the disease. There were 11 cures, two cases showed improvement, and there were two failures. The injections given hypodermically were followed by but little local reaction, and only a slight rise of temperature. In the majority of cases the attacks diminished in number after the first injection, and disappeared altogether after the third or fourth, leaving in a few cases a non-paroxysmal cough, which disappeared entirely in a few days.

(188) Auricular Flutter in Acute Rheumatic Carditis.

J. A. Sutherland (British Jour. of Children's Dis., August, 1914) discusses a specially important causal factor in the cardiac failure of acute rheumatic carditis, viz., the development of an abnormal rhythm of the heart. This abnormal rhythm is not to be detected by examination of the pulse or apex beat, but by the electrocardiograph, or less precisely by means of a venous tracing taken with the polygraph. A number of auricular contractions fail to initiate ventricular contractions, not because of the presence of heart block, but because of an inability on the part of the ventricle to respond to each auricular

stimulus owing to the extreme rapidity of the auricular contractions. This disorderly sequence of contractions results in improper and irregular filling of the ventricles with blood, and consequent embarrassment of a heart muscle already weakened by the inflammatory trouble. This condition of auricular flutter is often latent and unsuspected, and the author suggests five possible indications of its presence: (1) Attacks of cardiac asthma (great dyspnœa), occurring suddenly and without accompanying variations in the cardiac condition. (2) A triple or galloping, or cantering rhythm heard on auscultation. (3) Pericarditis without effusion, and with great respiratory distress. (The inflammatory changes in pericarditis are usually earlier and more marked about the auricles than the ventricles, and a disturbed auricular rhythm may follow from the active effusion in and around the auricular walls). (4) Dyspnœa, cyanosis, and enlargement of the liver out of proportion to the physical signs of disease in the heart. (5) The presence of the pulsus alternans.

PATHOLOGY.

(189) Vaccine Treatment of Typhoid Fever.

A. T. Sloggett, Director-General of the Army Medical Service, in a letter from the War Office to "Public Health," (September, 1914, p. 421) invites attention to the vaccine treatment of typhoid fever. He states that the advantages claimed for this treatment, which, from its simplicity, would appear well suited to field conditions, are the following:—

I. The average case-mortality of more than 40 series of published cases has been about 4 per cent.
II. The disease is rendered definitely milder in type, the majority of the usual distressing symptoms being absent.
III. A remarkable freedom from relapses and complications.
IV. Convalescence has been more rapid.

He points out that in the field an autogenous vaccine, the bacillus for which can be obtained in hospital with comparative ease in the early stages of typhoid fever by withdrawing blood from a vein and cultivating it under suitable conditions, will rarely be found possible of achievement, but that the ordinary phophylactic typhoid vaccine may be used with confidence instead, and has been found to give excellent results. A special supply of quarter strength of this vaccine, standardised to 250 millions per c.cm. has been stored at the Base Medical Store Depot, specially labelled for this purpose. Sloggett recommends that inoculations should be made at the earliest possible moment, even before the diagnosis is fully established in suspicious cases. No harm will follow should the case prove not to be one of typhoid fever. It is best to commence with a dose of 150 to 250 millions, and the inoculations should be repeated every second or third day, the dose being raised progressively to 500 or even 1,000 millions, if the earlier doses are well tolerated. If vaccine treatment is not commenced until the case is well advanced, or if the case is exceptionally severe from the first, the initial dose should be smaller, and the later ones increased cautiously. Such cases do not respond so readily to the vaccine.

(190) A New Pathogenic Coliform Bacillus.

Castellani (Cent. f. Bakt. etc., Orig., June 13, 1914) has isolated on three occasions, from cases clinically resembling moderately severe typhoid fever, an organism which he has called b. columbense. The fever lasted from three to five weeks, and was accompanied by an enlarged spleen in two of the cases. One patient had several relapses. Constipation was present in two and slight diarrhœa in the other. In one, severe bacilluria persisted for several months. Agglutination reactions against b. typhosus, b. paratyphosus A. and B., b. asiaticus and m. melitensis were always negative. The organism was grown from the stools of all three, from the blood of one, and from the urine of one. As a rule, the organism grew more luxuriantly on agar than b. typhosus. On certain classical media it showed a tendency to vary. Thus litmus will, as a rule, first become acid and then alkaline and bleaching of the medium was of frequent occurrence. Occasionally the milk became permanently acid. After several weeks thickening of the milk and even real clotting occurred, though very rarely. Gelatin was not liquified. On lactose the freshly isolated bacillus had no action. After several transplantations, however, in some cases there was very slight fermentation, in others none. On lactose red agar, the colonies were always permanently white. Acid and gas were produced on the following sugars: Dulcite, mannite, glucose, maltose, dextrin, arabinose, sorbite, galactose, lævulose, salicin, isodulcite and glycerine. No change occurred in saccharose, raffinose, adonite, inulin, inosite, amygdalin or erythrite. The organism was motile and produce indol. The three strains were agglutinated, in dilutions varying from 1 : 40 to 1 : 160, with the sera of the last two patients. Agglutination and absorption experiments showed that it differed from b. typhosus and the paratyphoid bacilli.

(191) Bacterial Mutations.

Two interesting general articles have recently appeared on this subject, one by G. D. Maynard (M. J. of South Africa, Aug., 1914), read before the Public Health Section of the South African Medical Congress, the other by Professor Haendel, of Berlin (J. of State Medicine, July, 1914), in German. The former suggests that perhaps our old views as to the stability of bacterial species may require revision as the result of the mutation experiments of de Vries amongst higher organisms. If pronounced mutations occur in the latter they may be expected with greater frequency amongst the more lowly bacteria, more especially since in these the restraining influence of the sexual union of gametes is absent. He suggests that practical experience lends support to this view, which may explain isolated cases of diphtheria and typhoid fever, altogether untraceable to previous cases or carriers, as well as the marked annual recurrence at a definite season of the fear of sporadic cases of typhoid fever. Such phenomena, due to mutational changes in an otherwise harmless saprophyte, might be expected to occur provided the circumstances in which such organisms were placed were practically identified with those which gave rise to the first mutational change to a pathogenic typhoid bacillus. It would be a question of history repeating itself. The author then proceeds to deal with various concrete examples of recorded mutations. He refers to Dobell's article in the J. of Genetics (vol. 2, No. 4), and to Penfold's in the J. of Hygiene, both dealing with the colon-typhoid group. Theile and Embleton's work (Lancet, 1913) state that non-pathogenic bacteria (e.g., b mycoides) may become pathogenic if injected into sensitized animals, and that thereafter they are pathogenic also to normal ones. An anthrax-like disease may thus result from b. mycoides, and diseases resembling tuberculosis from the smegma and Timothy grass bacilli. Conversely Dostal claims to have converted a tubercle bacillus into a non-acid-fast, non-pathogenic form. Rosenow (J. of Infect. Dis., Jan., 1914), and others, seem to have converted pneumococci into streptococci, and vice versa. Theile and Embleton consider that a Hoffmann's bacillus in their hands has become morphologically a diphtheria bacillus, and has secreted a toxin. Maynard himself has had under observation a strain of m. melitensis which became bacillary, and, a most important point, a subculture of this strain, sent to another laboratory a year before, was also, on examination, found to have undergone a similar change. He has also met with diphtheroid forms of pneumococci, cultures showing first one type and then the other. Haendel's paper covers much the same ground, full descriptions of colon and cholera mutants being given. It is interesting to note that accompanying changes in the appearances of the colonies were changes in morphology.

(192) Sleeping Sickness

A. J. Chalmers and W. R. O'Farrell ("Journ. Trop. Med. and Hygiene," September 15, 1914), give an excellent account of the researches on sleeping sickness in the Lado of the Anglo-Egyptian Sudan, conducted by the Wellcome Tropical Research Laboratories. They find that sleeping sickness in the south is caused by T. rhodesiense, and spread by Glossina morsitans; that the equatorial form is caused by T. castellanli, and spread by G. palpalis, and that the form in the north is probably caused by T. gambiense and by T. nigeriense.

Contract Practice.

IV.

The British Medical Association.

It is at times a useful procedure to take stock of the ways and means available in the conduct of business, warfare or negotiations. A little recapitulation should not be feared in this undertaking. For this reason, it may be well to consider the organization of the medical profession in the British Empire before the recent history of Lodge practice in Australia is discussed, and past achievements and future prospects of the profession in connexion with this form of practice are summed up. That this interlude may serve a useful purpose is suggested by the misconceptions which obviously exist in the Commonwealth as to the constitution of the British Medical Association and the powers of the various branches. It is frequently urged that the conditions of contract practice are quite different in the Mother Country to what they are in Australia, and that comparisons should not be made nor deductions drawn. While this is true to a certain extent, it must be remembered that the British Medical Association is governed by a Memorandum of Association and by Articles and By-Laws under the Companies' Acts, and that its powers and limitations are identical all over the Empire. The organization of the medical profession on which co-ordinate action depends is guided, governed and limited by the powers of the Association, as well as by such powers as any strong unit of the profession may obtain for itself.

Historical.

The British Medical Association was founded for three objects. First came the advancement of scientific and social work of the profession; secondly, there was the safeguarding of the honour and interests of the profession; and thirdly there was the publication of records, transactions and journals. Toward the end of the past century, it was recognized that the first and third objects were being carried out in a highly useful manner, but that the second object had not been developed to anything like its full extent. This matter was thoroughly analysed by a Constitution Committee, which was appointed in 1900, and in the year 1902 the new constitution of the Association was introduced. Previously there had been no Divisions and no Representative Meeting; no Medical Secretary's department and no actual medico-political organization. The changes were effected by the alteration of the Articles and By-Laws, the Memorandum of Association remaining the same as that approved by the Board of Trade in 1874. The objects of the Association are set out in the Memorandum as follows: the promotion of medical and the allied sciences and the maintenance of the honour and the interests of the medical profession by the aid of all or any of the following:—

(a) Periodical meetings of the members of the Association and of the medical profession generally, in different parts of the country.
(b) By the publication of such information as may be thought desirable in the form of a periodical journal, which shall be the journal of the Association.
(c) By the occasional publication of transactions or other papers.
(d) By the grant of sums of money out of the funds of the Association for the promotion of the medical and the allied sciences in such manner as may from time to time be determined on.
(e) And such other lawful things as are incidental or conducive to the attainment of the above objects.

It will be seen that the powers obtained by the Association were restricted to a certain extent by these provisions, and that while it could not undertake any action which was not included in the specified objects, there was always a risk that the Courts might in a manner unfavourable to the development of the activities of the Association, interpret what was and what not ultra vires. Nevertheless, the Constitution Committee regarded this Memorandum as satisfactory at the time, and the constitution of the Association was recast within the limits imposed by it. Being a Company, registered by the Board of Trade under the Companies' Act, but not for the purpose of profit, it was necessary to arrange for an Annual General Meeting of members. The actual government of the Association was vested in the Representative Meeting, but any proposed change of Articles or of constitution had to receive the approval of the General Meeting, as had the election of office bearers. The country was divided up into Divisions, each of which had a right of a single representative at the Representative Meeting. In certain cases Divisions in combination obtained representation in the Representative Meeting. Furthermore, the Executive Committee of the Association was the Central Council, and working partly under the Central Council and partly as sub-committees of the Representative Meeting were various central committees, appointed annually for medico-political, organization, medico-ethical and other purposes. The Divisions were grouped together to form branches, but in certain instances a single Division constituted a Branch. In the latter case, the special duties, obligations and functions of the Branch Council fell away to a large extent, and the Division having the title of Branch was provided with a Branch Council with the same governing powers as any other Divisional Committee. The Branch Councils, however, had one distinct privilege, namely, the election of a representative or representatives on the Central Council. In practice, the Divisions usually nominated candidates, and the election was undertaken by a postal vote in the areas of the grouped Divisions, corresponding to the areas of the Branches. In the new constitution it was recognized that the introduction of the divisional system for the old Branch system could not be effected in all cases, and it was, therefore, left to the option of all overseas Branches to continue on the old lines of government by units called Branches, or to adopt the more democratic principle of smaller units with direct local representation on the Representative Meeting. It will be necessary to return to this matter later, when the present conditions are being discussed.

The changes did not satisfy the members of the Association for long. In 1904, a number of members urged the Council to take into consideration the restricting effect of the existing Memorandum of Association, and to advise the Representative Meeting on the methods which might be adopted to secure for the Association such extended powers as would enable it to undertake various actions. In 1905 the Representative Meeting considered the advisability of applying to the Privy Council for a Royal Charter. Counsel's opinion had been sought in regard to this question, and the meeting was informed that under a charter the somewhat troublesome restrictions imposed by the Companies Acts would be removed, and that the activities of the Association would not be limited by the stated objects. In spite of some objection to this course of action, the meeting determined that a draft Charter be drawn up and submitted to a subsequent meeting. The draft was duly prepared, and included a re-statement of the objects of the Association. In addition to the promotion of scientific work, and the maintenance of the honour and interests of the Medical Profession, were added the following words:—

> " . . . . . and the co-operation of the members of the Association for their mutual assistance and support in all matters affecting them in their professional capacity, including the encouragement, promotion, or provision of means for protecting members and their families against the exigencies of age, sickness, death or misfortune."

Certain new methods were introduced, including the power to originate, support, promote or oppose alterations in the law effecting the public health or the medical profession, to promote the candidature of any member of the Association for any Legislative Assembly, medical defence, medical agency work, the establishment of provident and benevolent funds, and the power to contribute thereto and the execution of trusts. The last sub-clause dealing with methods is extremely elastic, and reads as follows:—

> "(x) May take such other means (whether of the same nature as the means hereinbefore stated or not) as may seem to the Association incidental or conducive to the promotion or carrying out of the foregoing objects or any of them."

It is unnecessary to recapitulate the term of the draft Charter, for after extremely careful consideration and re-

consideration, a petition was lodged before the Privy Council in December, 1908, and was opposed in February, March, and April, 1909, by the Royal Colleges of Physicians of London, and of Edinburgh, the Royal Colleges of Surgeons of England, and of Edinburgh, the Society of Apothecaries, the University of Edinburgh, the British Medical Benevolent Fund, the Society for Relief of Widows and Orphans of Medical Men, certain branches of the Association, and 603 members. An attempt was made to overcome the opposition to the granting of a charter, but for financial and other reasons this attempt was relinquished.

In 1910, it was determined to amend the Articles and By-Laws in such a manner as to extend the powers of the Association as far as would be possible under the existing Memorandum, and at a later date to wind up the Association and to start again under the Companies' Acts with a new Memorandum of Association. The instructions given by the Representative Meeting to the Council were that all the objects included in the draft Charter should be embodied in the Memorandum.

British Medical Association News.

SCIENTIFIC.

A meeting of the New South Wales Branch was held at the B.M.A. Building, 30-34 Elizabeth Street, Sydney, on October 30, 1914. Dr. Armstrong, the Vice-President, was in the chair.

Dr. A. E. Finckh read a paper on "Tuberculin in the hands of the General Practitioner: a critical consideration of the original and modern claims of Tuberculin." He stated that it was generally acknowledged at the present time that tuberculin was one of the most valuable adjuncts in the treatment of tuberculosis. A practitioner who criticised the value of tuberculin adversely was incapable of allowing his judgement to be guided by experience. The reason why he, the speaker, although a pathologist, chose this subject was that the whole question was a scientific one. Further he pointed out, that when he was a senior student at the Sydney University, some 12 years previously, the dispute as to the value of tuberculin was raging fiercely and the differences of opinion held by teachers and examiners rendered the position of the student an extremely difficult one. The majority of students was, at that time, inclined to take the side of the non-believer in tuberculin. Unfortunately many carried that opinion into private practice, but some had sufficient scientific instinct to realize that there was a chance for tuberculin in the future. A few years later Dr. Finckh when visiting some of the famous University Clinics in Europe, attempted to get at the real truth in regard to tuberculin. He was disappointed in finding that tuberculin was not even granted a tentative trial. Several eminent physicians stated that they did not believe in it, that they had never seen any good result following its use, and that they could not see why it should be of use. He elicited the fact, on minuter investigations, that there was a scientific reason for this attitude. The argument adduced was as follows:—

Any therapeutic agent may be introduced into the pharmacopoeia, if it satisfies one of the two following demands: (a) that there is empirical proof of its efficacy; or (b) that a cure may be expected on theoretical grounds. Quinine in malaria and mercury in syphilis were two examples of the former. Anti-diphtheritic serum and salvarsan were good examples of the latter. In the case of tuberculin, neither empirical nor scientific proof of its efficacy was forthcoming when it was first introduced. "And herein lay the calamity accompanying its introduction. A statement like this may come as a surprise to many; it may sound like heresy to others." The speaker referred to an article by Sahli, of Berne, which appeared in the "British Medical Journal" of April 11, 1914, under the title of "A Contribution to the Critical Study of Therapeutic Statistics." It appeared that the old time adherents of tuberculin accepted Koch's original experiments as the basis for the action of tuberculin. He referred to the narrow-minded and biassed attitude adopted by some men in Australia at that time. Koch's original explanation was that tuberculin, although incapable of directly destroying the tubercule bacillus, caused a necrosis of the tuberculous tissue, that is of that part of the animal organism in which the bacillus had taken root. The bacillus being deprived of its nutrition could not survive. Other investigators denied the curative effect of tuberculin. In their animal experiments they were unable to find pathological anatomical proof of a curative effect. The microscopical examination of human tuberculous tissue from patients who had been treated with tuberculin showed no pathological differences from similar tissues of untreated patients. Koch further stated that if a guineapig, suffering from tuberculosis, were infected a second time through the skin, the result was a localized infection followed by necrosis. This led to a flat ulceration, which healed rapidly without a spread of the infection to the neighbouring lymphatic glands. This experiment was interpreted as evidence of a localized immunity produced by the first infection. A totally different interpretation was now placed on this phenonemon. It was regarded as a tuberculin reaction in the neighbourhood of a newly developing tubercle in an already tuberculous animal. Tuberculin gave rise to an acute exudative inflammation in the neighbourhood of fresh tubercles which might cause the total expulsion of the tubercle by ulceration.

In Koch's experiment tuberculin was present in the blood, and on the formation of a new tubercle a typical tuberculin reaction took place. Dr. Finckh pointed out that this phenomenon was not constant in guineapigs, which are the most sensitive of the laboratory animal towards tubercle bacilli, and that it did not occur in rabbits. He suggested that man behaved like rabbits in this respect. He quoted the following words from Sahli's articles:—"Koch made a mistake in the interpretation of the results which he then obtained; no one bases himself now on those far distant experiments."

He did not think it conceivable that the whole profession would refuse Koch's dictum, unless there had been some very grave reason for the assumption that the laboratory experiments had been wrongly interpreted. The scientists in the profession had proved that tuberculin did not possess a specific curative action, and also that in regard to tuberculosis and tuberculin neither active nor passive community were involved. Tuberculin has come to the front again in spite of Koch's teaching. Tuberculin was composed of all the water-soluble substances of the bacilli. Dr. Finckh considered that it would be reasonable to anticipate that anti-infectious and anti-toxic immunity would be obtained if the injections were continued for a sufficient length of time. The failure to detect signs of this immunity need not exclude the presence of small quantities of immune bodies. He was also prepared to admit the possibility that the serum of animals treated with tuberculin might contain substances which would be capable of neutralizing or diminishing the toxic effect of tuberculin. These considerations led to the suggestion that the organism of a tuberculous subject would offer a more favourable prospect for an active immunization by tuberculin than a healthy organism. In spite of the fact that tuberculin was shown to be quite incapable of exerting a curative effect in laboratory animals, these considerations prevented it from passing entirely into oblivion.

The new era of tuberculin was based entirely on clinical experience. The action of tuberculin was shown to be a rational process of healing, and was not connected in any way with the destruction or neutralization of the ætiological factor of the disease. Sahli and Wright's work was epoch-making. Sahli recognized that tuberculin treatment was not equivalent to anti-toxin treatment, and that it was not a process of immunization. He had persuaded himself that tuberculosis was a disease which could not make headway when the power of resistance of the organism was maintained. He conceived the idea that the action of the toxin of tuberculosis might be overcome by producing a tolerance by administering gradually increasing doses of the toxin itself, i.e., tuberculin. He believed that the treatment was a process of protection brought about by mithridatism, somewhat as tolerance of large doses of arsenic or morphine was brought about by the taking of gradually increasing doses of these poisons. Sahli was convinced that instructions regarding the use of tuberculin could be laid down in a manner sufficiently precise to enable the practitioner to administer it. His method aimed at the production of a tolerance of such strength as would counterbalance all the autogenous toxin poured into the system.

No reactions were produced, and in this way the responsibility of deciding to what extent reactions should be produced was removed. The doses were increased extremely gradually, and an optimum and not a maximum dose was aimed at. The speaker referred to the fact that the results arrived at by Almroth Wright, with the aid of his opsonic index coincided with those obtained by Sahli on clinical grounds. Both workers agreed in regard to dosage and to whether reactions should be aimed at or not.

The decision of the question whether tuberculin should be placed in the hands of the general practitioner must depend on whether the Sahli-Wright doctrine or the Koch doctrine were accepted. If Koch was right that reaction should be aimed at, tuberculin would be too dangerous a weapon to place in the hands of the busy practitioner. If reactions should be avoided altogether, then it would be granted that it would be a safe remedy. Dr. Finckh contended that Sahli's and Wright's teaching had not been contradicted, and that tuberculin, if used in strict accordance with their instructions was absolutely safe in the hands of the average general practitioner.

Dr. F. Guy Griffiths found Dr. Finckh's paper unusually interesting, especially the first part. He agreed with a great deal contained in the opening part, but disagreed entirely with the latter part of the communication. Before dealing specifically with the views expressed, he pointed out that Batty Shaw had published the objections to Koch's experimental interpretation a year before Sahli had done so. Dr. Finckh had stated that there was no scientific foundation for the use of tuberculin according to Koch's views. This was not so. Arloing and Courmont have adduced evidence of specific immune bodies produced by tubercle bacilli in the living organism. Their work on the agglutinins in tuberculosis had been confirmed by Koch himself, who had worked with Arloing at this same subject. It had been confirmed by many other workers. He further wished to point out that Wassermann and Bruck had first studied complement deviation in connection with tuberculosis, and that at a later date they had turned their attention to complement deviation in syphilis. Sahli's criticism was, in the speaker's opinion, mistaken for two reasons. In the first place, he had overlooked these two scientific facts, and in the second he had adopted the peculiar views on immunity enunciated by Wolff-Eisner. He objected to the light-hearted criticism and denial of evidence brought forward by Koch. Koch has contributed such important discoveries that it was incomprehensible that his chief work should be swept aside without attention being paid to it. Opinions of this kind should not be considered seriously. Dr. Finckh had stated that tuberculin was a very active and dangerous substance, and in this he agreed. He deduced therefrom that it was only safe in the hands of a practitioner who had made a special study of its uses. He spoke of the haphazard manner in which many general practitioners utilized tuberculin. He cited instances in which men had ordered cases of tuberculin bottles from the wholesale chemist. One man had stated that he always gave "one twentieth," but was quite unaware of what or of the kind of tuberculin he was using. The danger of such practice would be realized when it was remembered that diluted tuberculins tended to become inert, while in an undiluted condition they retained their efficacy for years. In the next place, no one with any knowledge of tuberculin treatment would repeat the same dose indefinitely. The only way to employ tuberculin was to prepare the dilutions at home. It was difficult, if not impossible, to anticipate what doses might be required. This could only be ascertained from clinical observation, and it was only on occasion that the size of three or four doses could be fixed at one time. Further, permanent results could only be obtained when large doses were being given. It was essential to avoid unnecessarily severe reactions, and to increase the dose steadily. For this reason, no scheme could hold good for the treatment of tuberculosis by tuberculin. Dr. Griffith spoke at some length on the harm done by the confusion of signs and symptoms of affections occurring in a tubercular patient, but produced by some independent cause. Tuberculin at times did great harm. For instance, when enteric fever was present in a person who had latent tuberculosis, it was extremely dangerous.

The speaker pointed out that certain patients evinced a marked idiosyncrasy against certain varieties of tuberculin and yet did very well when treated with another form. His opinion was that general practitioners who turned their attention to surgical practice could not find time to acquire the necessary technique and knowledge essential for a safe employment of tuberculin.

Dr. Mills stated that he wished to offer some severe criticism in a very friendly spirit. He was surprised that a pathologist should speak of tolerance in connexion with tuberculin, and compare it with tolerance obtained by people who take arsenic or morphine. The tolerance so-called to arsenic in doses of up to 7 grains had been investigated by Besredka. When a large dose of arsenic was injected intraperitoneally into a laboratory animal, a hypoleucocytosis was produced, and this was followed by a hyper-leucocytosis. If a small dose were injected in the evening, and on the following morning a lethal dose was given, no effect was produced on the leucocytes. The arsenic was taken up by the leucocytes and gradually excreted from the body at a later date. This was a biological phenomenon, and was comparable to immunity. It was quite misleading to speak of it as tolerance. In the case of morphine, when large doses were given to dogs, the bulk was passed out through the bowel. It was possible to establish a condition in which the dog would take large doses of morphine without passing any out through the bowel, and without exhibiting any symptoms of poisoning. The alkaloid was taken up by the liver cells, and only liberated gradually in minute traces. Tolerance was not in question, but the process of immunity was called into play in a manner precisely similar to that expounded by Ehrlich in regard to abrin, ricin and other poisons.

Dr. Mills next called attention to Much's work on immunization by means of tubercle bacilli dissociated in the presence of acids (glacial acetic, lactic and the like). The products of the dissociated bacilli conferred a demonstrable degree of immunity. Animals treated in this manner were subjected to the infection of virulent tubercle bacilli, and in the exudates bactericidal bodies were found. This phenomenon was analogous to Pfeiffer's phenomenon. In his opinion, tuberculin was just like any other vaccine, and it did not matter much whether the whole bacillus or part of it was given. He preferred bacilliary emulsion, and had still to be shown that the results obtained by others were better than those obtained by him. He made his own dilutions. He endorsed what Dr. Griffith had said in regard to the careless manner in which tuberculin was sometimes given, and especially in regard to bottles bought from wholesale firms. In turning his attention to the value of tuberculin as a therapeutic remedy, he pointed out that formerly he used to give tuberculin to all persons who reacted to a diagnostic dose. He did not do so now. The majority of people were infected, but not affected with tuberculosis. It was necessary to have definite signs of disease before the case was regarded as requiring treatment. The aim in tuberculin therapy should be to give the largest dose which would not do harm. He was opposed to the doctrine of Finckh and Wright in this respect. The doses should be increased steadily. It does not require a specialist to give tuberculin. Provided that he gave a reasonable amount of care and attention to the subject, the ordinary general practitioner should be able to use it.

Dr. Sinclair Gillies was disappointed in Dr. Finckh's paper in that he had hoped that it would have contained instructions for the general practitioner how to use tuberculin. He had come to the conclusion that tuberculin did good in carefully selected cases, in suitable doses and with suitable intervals. The difficulty experienced was in respect to these three points. Everyone was agreed that the patient must be afebrile, and show normal weight, and but slight physical signs. Under such conditions, however, it was often extremely difficult to determine whether the process in such a case was active or quiescent. It was easy to cure an arrested case. He was convinced that tuberculosis was a highly recoverable disease, and like many other pathological conditions, it was by no means easy to determine which treatment did the greatest amount of good. Dr. Samuel Gee had stated years ago that the only thing a man proved when he gave a prognosis in cases of pulmonary tuberculosis was that he was a fool.

Various clinicians had claimed that they obtained good results with special doses. Some had found that the best results were obtained if the doses were repeated every second or third day, while the workers in the St. Mary's school had found that the opsonic index was lowered up to the fifth day, and that the dose should therefore not be repeated until five or seven days had elapsed. At the Brompton Hospital, Inman commenced with 0.0001 of a milligram of bacilliary emulsion, and worked his doses up to 0.1. At Frinley, the initial dose was 0.00001, and the maximum 0.6001. Gauvain, at the Treloar Cripples' Home, at Alton, had studied the effect of various doses of tuberculin on the opsonic index. He found that in cases of advanced tubercular disease of the hip the opsonic index, after complete immobilization had been achieved, was on an average 1.2. The index was not influenced by giving tuberculin by Wright's method. Dr. Gillies referred to the experience of Citron, who, after trying sensitized bacilliary emulsion, had given this up in favour of pneumothorax. As the results were not improved by this procedure, he had now determined to give Friedmann's remedy a trial. He was convinced that quite good results were obtainable in suitable cases, and that very great harm was done in unsuitable cases. It was essential to utilize all the remedies and methods of known value as well, and to regard tuberculin merely as a supplementary therapeutic agent. In some cases, when given in small doses, tuberculin acted psychically, and should be employed in this manner. Dr. Gillies cited cases illustrating this use of tuberculin. He questioned the evidence supporting the statement made by Dr. Griffith that permanent immunity could be produced by large doses. In conclusion he expressed the opinion that tuberculin was not a cure-all, and that great reliance should not be placed on it. It was, however, a safe remedy, provided that the cases were properly sepected.

Dr. R. Woolnough agreed with the remarks of the last speaker, and gave a brief account of his experience of tuberculin in general practice.

Dr. Finckh replied briefly. He met Dr. Griffith's criticisms by stating that reliance could not be placed on Wassermann's work in connexion with the complement fixation in tuberculosis. He made a general attempt to justify his use of the term tolerance, but did not enter again into the question of whether the process should be regarded as a biological reaction or an induced habit resulting from repeated use.

MEDICO-POLITICAL.

A meeting of the Council of the Victorian Branch was held at the Medical Society Hall, Melbourne, on Wednesday, October 18, 1914, Dr. Kenny in the chair. The manager of the "Australian Medical Journal" reported that the affairs of that Journal had now been finally wound up, and the books closed.

Arrangements were made for the general meeting on December 2, 1914, and the form of nomination paper was approved; nomination papers will be sent out on October 31, and will be returnable on November 11; the nominees will then be written to for their consent to such nomination; and on November 25 the ballot papers will be issued to members residing more than 20 miles from the G.P.O., Melbourne, and to those within that radius who shall have made application before November 25. A sub-committee was appointed to draw up the annual report.

The following were elected as members:—

Dr. John Leslie Ross-Soden, Women's Hospital, Melbourne.

Dr. Mary Wilhelmina Mitchell, Sefton, Queenscliff.

Dr. Robert Fulton Craig, 89 Royal Parade, Parkville.

The Legislative Sub-Committee submitted amendments of the rule for approval of the Council and for submission to members at a special meeting to be called on evening of the annual general meeting in December. The effect of these amendments will be to produce a complete system of voting by post instead of the limited operation to country members as in the past. This scheme, if adopted, will come into operation in December, 1915.

It was announced that at the next monthly meeting papers would be read by Dr. W. Kent Hughes and by Dr. C. E. Dennis, while Professor R. J. Berry would bring before members his scheme for transferring the Medical School of the University to a site on or near that of the Melbourne Hospital.

The following has been elected members of the New South Wales Branch:—

Dr. Lennox Teece, Royal Prince Alfred Hospital.

Dr. Robert Kellas, Lismore.

Dr. Joshua Young Wai, Goodooga.

Dr. T. Earls Davis, Royal Prince Alfred Hospital.

The following have been nominated for election:—

Dr. William Alexander Dunn, 219 Macquarie Street, Sydney.

Dr. Leslie William Dunlop, Sydney Hospital.

Dr. Noel E. Kirkwood, Gladesville.

Special Correspondence.

(From our Special Correspondent.)

LONDON LETTER.

The Cancer Research Fund.

The annual meeting of the Imperial Cancer Research Fund was held at the Examination Hall, Queen Square, Bloomsbury, on July 31.

The Duke of Bedford was in the chair.

Dr. E. F. Bashford, the General Superintendent and Director of the Laboratory, in his annual report, dealt particularly with the question of so-called "cancer-areas" and "cancer-houses." A few experimenters working on a small scale had, he said, recorded aggregations of cases, and had dignified them by the title of epidemics. Cancer-houses in the sense that animals housed in them became infected were a myth. Contact with animals with natural or inoculated cancer did not increase the liability to the development of the disease. The public was being misled by assertions as to the value of enumerating houses in which one or more cases of cancer had occurred. Such enumerations could only be preliminary to determining whether cancer was more frequent in certain houses than was to be expected if cases of cancer were not derived by communication. The determination as to whether cancer was more frequent in certain houses was very much more complex than a simple arithmetic enumeration.

The report goes on to state that the facts elicited for human populations accord with the more exact data for a laboratory population of mice. There is no positive evidence of infection of any kind whatsoever. Aggregations of cases of cancer, to have any significance at all, must occur with a frequency which removes them from all possibility of these being merely what would be expected, owing to the great frequency of the disease. In the course of years it is quite natural that a number of cases should occur in a village, a street, a house, or even a family which has inhabited the same house for generations, without the numbers necessarily meaning anything more than what was to be expected according to the theory of probabilities. This criticism applies without exception to all statements as to cancer-houses, cancer-streets, and cancer-villages, which have been adduced as evidence that cancer is infective, although this statement must not be understood as denying that cancer, or rather certain forms of it, occurring on different parts of the body, may, and actually do, vary in different areas. So far as the investigations into "cancer-houses" and "cancer-areas" have proceeded, they accord with what has been established by experiments on animals. "Cancer-houses" are as much a myth as are "cancer-cages."

With reference to the increase of cancer, Dr. Bashford says that "it is quite justifiable to make such a crude statement as that the number of deaths assigned to cancer has increased in 1911 for females to 1,088 per million living in 1911, as compared with 500 in 1860, and for males to 891 from 200 during the same period, and that it is also justifiable to express these facts in another way (also crudely), namely, that of women attaining the age of thirty-five,

1 in 12 was recorded as dying of cancer in 1889, but 1 in 7.4 in 1911, and of men 1 in 21 in 1889, but 1 in 9.7 in 1911. This latter statement also brings out more clearly how the male rate has been overtaking and approximating to the female. However, these figures ought not to be set out, as they still are before the public without any qualification, and interpreted forthwith as a demonstration of the reality of the increase of cancer." The increase in the number of deaths was not uniform for the different parts of the body, the results of successful surgery showing themselves in diminution of the deaths. All the statements widely circulated in the newspapers as to the increase of cancer as a whole, should, he argues, be ignored, and attention only paid to those in which cancers affecting the different parts of the body are considered.

No reliable data were available as to the heredity of cancer in man. In mice, however, hereditary predisposition had been shown to exist, sufficient to double the incidence of cancer in female mice in the ancestry of which cancer had occurred not further back than the grandmother, as compared with animals in which the cancerous ancestry was more remote.

The adoption of the report was moved by Sir William Church, and seconded by Professor Sims Woodhead.

Sir Richard Douglas Powell moved "That the thanks of this meeting be given to the chairman and members of the executive committee, the sub-committee, and honorary treasurer, and others who have assisted in the work of the Fund during the past year."

This was seconded by Sir John Tweedy.

A vote of thanks to the Duke of Bedford for his services in the chair was proposed by Sir William Watson Cheyne, and carried with acclamation.

The Royal College of Surgeons.

The annual election to the Council of the Royal College of Surgeons took place on July 2nd. The President (Sir Rickman Godlee) declared Messrs. W. Thorburn, C. A. Ballance, W. McAdam Eccles, J. Stanley Boyd and Charles Ryall to be duly elected. Messrs. J. B. Lawford, T. H. Openshaw, W. G. Spencer, Raymond Johnson, F. F. Burghard, T. H. Killock, P. M. Yearsley, H. S. Pendlebury and F. J. Steward were not elected. The poll was a record one, 1037 fellows voting. Messrs. Willmott Evans and Frazer acted as scrutineers.

The Society of Members of the College, which seeks for the members a share in the government of the institution, had obtained promises from three of the candidates to support the cause of the members. These candidates were Messrs. P. M. Yearsley, J. B. Lawford and T. H. Openshaw, who were not, however, successful in the ballot. For several years, at the annual meetings of the fellows and members, resolutions have been passed affirming the desirability of admitting members to direct representation in the council, but the council have not thought it expedient to accede to the request. It is claimed that as the number of members is over 17,000, and that of the fellows about 1600, a proportion of the council should consist of members, but the council has always been formed by fellows only. It is also urged that the members, being much more numerous than the fellows, pay more towards the upkeep of the College in the form of examination fees.

On the other hand, it is contended that the question should not be one of money but of the interests of science, that every member obtains value for his payment in the shape of a legal qualification, and that nearly every fellow has paid a fee for the higher grade, not in substitution for that for the membership, but in addition to it. It is also believed that the change which is advocated would be prejudicial to the status and progress of surgery in this country, and that the chief object of the College is to maintain the highest standard of what may be called major surgery, such as is commonly practised by fellows, but only seldom by members.

At a meeting of the council, a week later, Sir William Watson Cheyne was elected president, and Sir Frederick Eve and Sir Anthony Bowlby, vice-presidents of the College.

The following lecturers were elected for the ensuing collegiate year:—Hunterian Professors: Professor Arthur Keith, Messrs. Rupert Farrant, W. Sampson Handley, J. Howell Evans, Frederick C. Pybus (Newcastle-on-Tyne) and Harry Blakeway. Arris and Gale Lecturers: Messrs. F. Wood Jones and David Waterston. Erasmus Wilson Lecturer: Mr. S. G. Shattock. Arnott Demonstrator: Professor Keith. Odontological Demonstrator: Mr. J. F. Colyer.

Correspondence.

MOSQUITO DESTRUCTION.

Sir,—In the last number of the Journal (Oct. 24), page 411, you quote a most interesting paragraph on the above subject, from the valuable report of the Commissioner of Public Health of Queensland. Army Medical Officers and Medical Practitioners who are consulted upon matters relating to the mosquito danger would be glad to obtain information how to deal with waters inhabited by the larvæ.

Apart from the grave epidemiological danger, these insects are a terrible pest. They abound almost everywhere, and are not only to be found in the Commonwealth and New Britain and all warm climates, but also are to be found in other parts of the world, where most people would regard them as to be quite unexpected. Climate does not appear to block them, for in Lapland they are a serious nuisance. ("Through Arctic Lapland," by Cutcliffe Hyne: Collins and Co.).

Information is sought upon the following practical points:—What is the best oil? or oils? What is the probable cost per gallon? What quantity should be poured over an area of, say, 1 square yard, or 10 square yards, or 100 square yards, or 1000 square yards? What is the best method of spreading the oil? How often should the operation be repeated? What time of day- What months of the year? etc.

With apologies for troubling you. —Faithfully yours,

Medical Officer A.A.M.C.

[For practical purposes it may be well to divide mosquitoes into three classes: (1) the anopheline, (2) mosquitoes which breed in collections of water in or near houses, and (3) bush mosquitoes. In the first group the anopheles, which carry malaria, are included. These mosquitoes prefer clean natural water to breed in, and are frequently found in pools among vegetation and in swamps. At times, however, they breed in running water. The second group includes Culex fatigans, the common house mosquito, which is the carrier of filaria, and possibly also of the parasite of dengue, and Stegomyia fasciata, the carrier of yellow fever. The former breeds in any collection of water, in water pots, bedroom water jugs, old tins, house drains and traps. It also breeds in liquid manure and in sewage. The latter breeds in stored water, water barrels, and the like. The bush mosquito include a vast number of species varying in different localities. They are annoying, but not dangerous, and as far as is known do not carry any disease germs. Culicelsa vigilans prefers salt water to breed in.

The campaign against mosquitoes consists in (a) the elimination of the breeding haunts and (b) field work. All rubbish likely to retain water, such as old tins, pots and barrels should be destroyed, temporary collections of water cleared up, and water tanks, and other water containing receptacles which cannot be emptied, should be properly screened. Field work consists in the draining of swamps, marshes and pools, where possible, and the proper construction of cultivation channels. Where these measures cannot be adopted recourse should be had to oiling methods.

Culicides may be divided into (a) substances which, in aqueous solution act as chemical poisons, and (b) substances which, by forming a film on the surface of water act mechanically. Many different preparations of the former have been tried, but without marked success. They failed to kill the pupæ, and while destroying the larvæ, they destroy vegetable and some animal life, and render the water unfit for use. Various oils are used for forming a film on the surface of water. The most efficacious are the various forms of derivatives of petroleum. Crude petroleum forms a good thick film, which lasts for some time. Very crude products, however, are useless because, being heavy, they sink to the bottom; moreover, they do not form good films. Refined petroleum or kerosene may be used, but has the disadvantage of being too volatile. A mixture of crude and

refined petroleum is often used. The rock oils chiefly used in Queensland are "argolite" and "petrolite," which are the trade names for certain brands of kerosene or petroleum. The British Australian Oil Company supply the former. In Queensland half an ounce to the square yard is used. Boyce recommended 1 ounce. Since the object is the formation of a satisfactory film, the amount required for any sheet of water can readily be determined by the way in which the oil spreads. The oil may be sprayed, or applied by means of a rag tied to the end of a stick, or in the case of wells it may be simply poured on the water. Efficient oiling once a week should suffice to render the water useless for breeding, as the life cycle of the mosquito occupies about 10 days. When a very volatile oil is used the operation should be repeated more frequently. When the pupæ are abundant it is advisable to oil the water immediately the fact is detected. Night time is preferable on account of the slower evaporation, but where the process is carried out by gangs of oilers the daytime must be utilized. In regard to the last question, oiling under usual circumstances is required in the summer time. In the tropics, however, it may be necessary to repeat the operation throughout the year. The best plan is to oil whenever larvæ are found in the pools.]

THE ARMY MEDICAL CORPS UNIFORM.

Sir,—Dr. Dunlop's letter in your issue of 17 October brings forward a most important question. One would think that it did not require much thought to see that it would be advantageous in many ways to have a distinctive uniform for the Army Medical Corps. I brought this question up in the Naval and Military Section of the Second Intercolonial Congress held in Melbourne, but it received little support. At the time of the Boer war I advocated a distinctive uniform as stretcher parties were often fired upon. In the majority of instances the firing was at such a distance that the red cross on the khaki tunic could not be distinguished, and men engaged on a humane mission were subjected to unnecessary and very real risks, as the proportion of killed and wounded showed. The same reasons are even more urgent now. Dr. Dunlop's letter is very opportune.

Yours, etc.,
LEONARD W. BICKLE, F.R.C.S., Edin.,
Major A.A.M.C., Retired List.

Adelaide, October 24, 1914.

Public Health.

SMALL-POX EPIDEMIC IN NEW SOUTH WALES.

The number of small-pox cases reported to the Department of Public Health, New South Wales, during the week ended November 1, 1914, were:—

City of Sydney and Metropolitan District	20
Newcastle District	4
Yass District	10
Total	34

INFECTIVE DISEASES IN QUEENSLAND.

The following notifications have been received by the Department of Public Health, Queensland, during the week ended October 24, 1914:—

Notifiable Disease.	Cases.
Enteric Fever	9
Diphtheria	49
Varicella	25
Phthisis	7
Erysipelas	1
Scarlet Fever	2
Puerperal Fever	2
Infantile Paralysis	10
Total	105

Personal.

Dr. Keith Inglis has commenced practice at Drummoyne, New South Wales.

Dr. Craig, of Ayr, North Queensland, has disposed of his parctice to Dr. Augusto Ott.

Dr. Chenhall, who was in Berne, Switzerland, at the time of the outbreak of war, has returned to Sydney by the Blue Funnel Liner "Ulysses," and has resumed practice at Stanmore, New South Wales.

Dr. J. T. Tansey has resigned from his position as Medical Officer of Health in the Department of Public Instruction, New South Wales.

Dr. Graham has resumed practice at Brunswick-street, North Fitzroy, Victoria.

Dr. N. B. Watch has taken over the practice of the late Dr. Richard Harvey, at 51 Kimberley-street, Leederville, Western Australia.

Dr. A. S. Addison, Dr. W. N. Abbott, and Dr. Walton have resigned from their positions at the Auckland Hospital, New Zealand. They have joined the Expeditionary Force.

Dr. John E. Bateman has removed to Selwyn, Queensland.

Dr. G. Atkin Sampson has commenced practice at Maleny, Queensland.

Dr. Mary Delprat has commenced practice at 220 Glen Huntly-road, Elsternwick, Victoria.

Dr. W. Ritchie, late Assistant Surgeon to the Royal Samaritan Hospital for Women, Glasgow, has gone into partnership with Dr. Murray, of Armidale, New South Wales.

Dr. Crichton, of London, who has been appointed Medical Officer of the Solomon Islands, under the British Government, arrived in Sydney on November 1, 1914, by the R.M.S. "Medina."

Medical Appointments.

Dr. W. A. McDonald has been appointed Resident Junior Medical Officer at the State Hospital and Asylum, Rookwood, New South Wales.

The following appointments have been made at the Auckland Hospital, New Zealand: Dr. S. A. Stride as honorary emergency ophthalmic surgeon, Dr. C. E. A. Coldicutt as honorary emergency surgeon for ear, nose and throat, Dr. Jessie Scott as honorary anæsthetist.

Dr. T. L. Anderson has been appointed Acting Quarantine Officer at Fremantle during the absence of Dr. White.

Medical Appointments Vacant

DEPARTMENT OF TRADE AND CUSTOMS.
QUARANTINE SERVICE.

APPLICATIONS are invited for the position of QUARANTINE OFFICER in the Commonwealth Quarantine Service. Applicants must be qualified medical graduates, and must state their age and record of experience.

Salary, £400 per annum.

The position is exempted from the provisions of the Public Service Act or any of its amendments.

The Successful Applicant will be required to take up duty at Sydney or such other Station as may be directed.

Applications should be addressed to the Director of Quarantine, 51 Spring Street, Melbourne, and should be lodged on or before November 7th, 1914.

F. G. TUDOR,
Minister for Trade and Customs.

ROYAL ALEXANDRA HOSPITAL FOR CHILDREN,
Camperdown, Sydney, N.S.W.

CHIEF RESIDENT MEDICAL OFFICER REQUIRED.

APPLICATIONS are invited for the position of CHIEF RESIDENT MEDICAL OFFICER at the above Institution. Applicants must have graduated at least two years. Duties to commence on the 1st January, 1915. Salary, first year £200 per annum, increasing by £50 each year to £300. Applications, with testimonials, to be forwarded to the undersigned not later than the 4th December.

CLARENCE R. MOSS,
Secretary Royal Alexandra Hospital for Children,
Camperdown, Sydney.

APPLICATIONS are invited for the positions of two Hon. Relieving Physicians to the Anti-Tuberculosis Dispensary, Hay and Parker Streets, Haymarket (to fill the place of two of the honorary staff who have volunteered for active service). Applications to be sent in by November 11 to, and all particulars obtainable from

MISS VALLENTINE, Secretary,
B.M.A. Buildings, 32 Elizabeth Street.

LAUNCESTON GENERAL HOSPITAL.
HOUSE SURGEON.

APPLICATIONS, addressed to the undersigned, accompanied by testimonials, will be received up to Saturday, November 14th, for the position of HOUSE SURGEON at the above hospital. Duties to commence 10th December. Salary £200 per annum, with quarters and board.

C. NICKALLS, Secretary,
66 St. John Street, Launceston.

VACANCIES

NEW SOUTH WALES.—An Unopposed Practice in a large and important pastoral district. Cash take over £1000, including £300 from hospital and clubs. Premium £400.

NEW SOUTH WALES.—Practice in a rich agricultural and pastoral district. Income £1050, including £180 from hospital and clubs. No dispensing.

QUEENSLAND.—An Unopposed Practice in a farming district, with 3 hours rail from Brisbane. Income £1000, including £100 from clubs. Price for everything, including furniture, drugs, horse, etc., £500.

QUEENSLAND.—In a large seaport town, South Queensland. Income £1150, including £650 from transferable appointments. Price £600 cash.

NEW SOUTH WALES.—An old-established Practice with public hospital, in a rich agricultural district, near Sydney. Income over £1000. Price, including furniture, £500.

NEW SOUTH WALES.—Good Practice, within 12 hours rail from Sydney, the centre of a large agricultural district with fine climate. Income £1300. Price £450.

All club appointments are on approved rates. For further particulars, apply to Messrs. BRUCK & THOMSON, Medical Agents, 15 Castlereagh Street, Sydney.

Medical Appointments Sought, etc.

For IMMEDIATE DISPOSAL:—Private Hospital; registered accommodation for 15 patients, well established; healthy district, near railway terminus. Every modern appliance. Full particulars to registered nurses and medical practitioners on application to No. 766, Medical Journal of Australia, B.M.A. Building, 30-34 Elizabeth-street, Sydney.

A LADY, sister of a N.S.W. Doctor, SEEKS ENGAGEMENT with a Practitioner in Sydney or suburbs. Understands book-keeping, sterilizing of instruments, etc. Apply No. 625, "Medical Journal of Australia," B.M.A. Building, 30-34 Elizabeth Street, Sydney.

WANTED TO PURCHASE, a Medical Practice. Cash; take £1000 to £1500 a year.

Apply, MEDICO, G.P.O., Adelaide.

Births, Marriages, and Deaths.

The charge for inserting announcements of Births, Marriages and Deaths is 5s., which sum should be forwarded in money orders or stamps, with the notice, not later than the first post on Tuesday morning, in order to ensure insertion in the current issue.

Marriage.

SAMPSON—JAEGER.—On October 15, 1914, at Sydney, G. Atkin Sampson, M.B., of Maleny, Queensland, to Alice Jaeger, of Sydney.

Death.

HILL.—On October 30, 1914, at the Berry Hospital, Douglas Bayly Hill, M.B., Ch.M., of Nowra, aged 32 years.

Diary for the Month.

Nov. 11.—Victorian Branch B.M.A., Monthly Meeting. Last date for nominations for members of Council.
Nov. 11.—Melbourne Paediatric Society.
Nov. 12.—Victorian Branch B.M.A., Council Meeting.
Nov. 13.—New South Wales Branch B.M.A., Clinical Evening.
Nov. 17.—New South Wales Branch B.M.A., Council Meeting.

Important Notice.

Medical practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429 Strand, London, W.C.

Branch.	APPOINTMENTS.
QUEENSLAND. (Hon. Sec. B.M.A. Building, Adelaide Street, Brisbane).	Brisbane United F.S. Institute. F.S. Lodges at Longreach. F.S. Lodges at Warwick.
WESTERN AUSTRALIA. (Hon. Sec. 230 St. George's Terrace, Perth).	Swan District Medical Officer. All Contract Practice Appointments in W.A.
NEW SOUTH WALES. (Hon. Sec. 30-34 Elizabeth Street, Sydney).	Australian Natives Association. Balmain United F.S. Dispensary. Burwood District F.S. Institute. Goulburn F.S. Association. Leichhardt and Petersham Dispensary. M.U. Oddfellows Med. Inst., Elizabeth Street, Sydney. N.S.W. Ambulance Association and Transport Brigade. N. Sydney United F.S. People's Prudential Benefit Society. Phoenix Mutual Provident Society. F.S. Lodges at Braidwood. F.S. Lodges at Casino. F.S. Lodges at Lithgow. F.S. Lodges at Mudgee. F.S. Lodges at Orange. F.S. Lodges at Parramatta, Granville, Penrith and Auburn. Killingworth Colliery, Newcastle. Seaham Colliery No. 1, Newcastle. Seaham Colliery No. 2, Newcastle. West Wallsend Colliery, Wallsend.
SOUTH AUSTRALIA. (Hon. Sec. 3 North Terrace, Adelaide).	The F.S. Medical Assoc. Incorp., Adelaide.

EDITORIAL NOTICES.

Manuscripts forwarded to the office of this Journal cannot under any circumstances be returned.

Original articles forwarded for publication are understood to be offered to the "Medical Journal of Australia" alone, unless the contrary be stated.

All communications should be addressed to "The Editor," "Medical Journal of Australia," B.M.A. Building, 30-34 Elizabeth Street, Sydney, New South Wales.